THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XIX. No. 452—22ND YEAR.] LONDON, FEBRUARY 15, 1870. [Subscription per Annum. 15s. in Advance. 18s. Credit.] DOUBLE NO. Price 1s.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—
10,000 cubic feet of gas per ton of coal.
26-candle gas.
13¼ cwt. coke per ton of coal.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1828.
FIRE-BRICK WORKS, established 1804.
FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay.
The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article.
The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GEORGE GLOVER & CO.,
Patentees of the Standard Gasometers for the Government, and of the
IMPROVED DRY GAS-METERS.
These Meters are warranted to measure correctly and not to vary, and have come into general use more rapidly than any Meters hitherto manufactured.

PARIS EXHIBITION, 1867.
THE TESTING-HOUSE REPORTS.
The Reports prepared for the Science and Art Department, under the direction of the Lords of the Council, detail the arrangements made for testing the gas apparatus exhibited. In the testing-house erected by the Special Committee appointed to further this object a gasholder was constructed by Mr. G. Glover, being a *fac simile* of that produced and patented by him in 1860, and deposited in the Exchequer, under the provisions of the Sales of Gas Act, and British manufacturers of gas apparatus were invited by advertisement, and by direct application, to forward worthy objects for exhibition. Mr. G. Glover was, however, the only manufacturer who sent Meters to be tested. The report states that, as "Mr. Glover is a manufacturer of Dry Meters only, no opportunity presented itself of comparing their accuracy with that of Wet Meters under various circumstances, but the perfection to which that maker has brought his Meters prevents the possibility of those extravagant errors which are well known to exist where Wet Meters are used."
Particulars and lists of prices forwarded on application to Ranelagh Works, Ranelagh Road, Pimlico, LONDON, S.W.; 15, Market Street, MANCHESTER; or 127, Boulevard de Magenta, PARIS.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and OTHER OBJECTS in FIRE-CLAY," and they have also been awarded in the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.
JOHN RUSSELL and CO.,
THE OLD TUBE-WORKS,
CHURCH HILL, WEDNESBURY;
ALMA WORKS,
WALSALL, STAFFORDSHIRE;
and 69, UPPER THAMES STREET, LONDON,
Original Manufacturers of Wrought-Iron Gas-Tubes, and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam-Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest orders may be executed in a few days.
Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanized Tubes, &c.
N.B.—All goods thoroughly tested before sent out, and warranted.

JOHN BENT & SON,
WET AND DRY GAS-METER AND STREET-LAMP MANUFACTURERS,
BELL BARN ROAD, BIRMINGHAM.
ESTABLISHED 1830.
All materials found for the alteration of Public Lamps for lighting with the Rod. Regulators with Lava Burners.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS,
NEAR NEWCASTLE-ON-TYNE.
WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.
London Agents: JAMES LAWRIE & CO.,
63, OLD BROAD STREET, CITY, LONDON.

THE "LOTHIAN" CANNEL COALS.
These Cannels are extensively used in the Gas-Works of Edinburgh, where the illuminating power of the gas is the highest in Britain.
The yield per ton is 12,573 cubic feet; illuminating power, 33·8 standard candles; coke per ton, 1046 lbs.
Ports of Shipment, in the Firth of Forth.

BO'NESS CANNEL COALS.—This Cannel is largely used in Gas-Works where, in addition to high illuminating power, there exists a demand for superior Coke, it being the best Coke-producing Cannel of all Scottish Canneis. It yields about 11,000 cubic feet of 25 standard candle gas per ton.
Ports of Shipment, either the Forth or the Clyde.
Apply to J. and W. ROMANS, 53, Frederick Street, EDINBURGH; and 1, Walbrook, Mansion House, LONDON.

LESMAHAGO GAS COAL,
AUCHINHEATH COLLIERY,
LESMAHAGO, N.B.

JAMES FERGUSON & CO.
LESSEES SINCE 1832.
LONDON AGENTS:
JAMES LAWRIE & CO.,
63, OLD BROAD STREET, E.C.
CONTINENTAL AGENTS:
LA COUR & WATSON,
LEITH.

MEDAL AWARDED, EXHIBITION, 1862, "FOR GOOD WORK."
THE IMPERIAL TUBE COMPANY, BIRMINGHAM,
MANUFACTURERS OF
WROUGHT-IRON TUBES & FITTINGS, BRASS & COPPER TUBES,
GALVANIZED & GLASS ENAMELLED TUBES & FITTINGS,
LAP-WELDED IRON & BRASS BOILER-TUBES, ETC., ETC.
Twyere Coils for Blast Furnaces, Boring Tubes, Core Bars, Gun-Metal and other Cocks, Boiler Mountings, &c.
HUGHES'S PATENT TAPS FOR HIGH PRESSURES.

CROLL'S DRY GAS-METER,
PRIZE MEDALS.
LONDON, 1851;
NEW YORK, 1853;
PARIS, 1855.
(INVENTED & PATENTED IN 1844,)
COMBINING ALL THE LATEST IMPROVEMENTS,
MANUFACTURED ONLY BY
PRIZE MEDALS.
LONDON, 1862;
DUBLIN, 1865;
PARIS, 1867.
THE GAS-METER COMPANY, LIMITED,
238, KINGSLAND ROAD, LONDON, N.E.
A. ANGUS CROLL, C.E., Chairman. GEORGE RAIT, Managing Director.

JOURNAL OF GASLIGHTING NEWSPAPER PENNY

HENRY HOWARD & CO.,

COOMBS WOOD PATENT TUBE-WORKS,

OLD HILL, near DUDLEY,

MANUFACTURERS OF

HOWARD'S PATENT IMPROVED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

CORE BARS FOR IRONFOUNDERS, STOCKS, TAPS, AND DIES, IRON COCKS, &c.

London Agent—W. G. DAVIS, 2, Brabant Court, Philpot Lane, E.C.

PARIS, 1867.

CLASSES 24 and 53.

WILLIAM SUGG,

GAS ENGINEER.

LONDON, 1862.

CLASSES 13 and 31.

PUBLIC LAMP GOVERNORS, LEVER COCKS, AND POLE LIGHTERS,

LAMP METERS AND BOXES.

LOWE'S JET PHOTOMETERS CAN NOW BE RATED TO 14 CANDLES.

VINCENT WORKS, VINCENT STREET, WESTMINSTER, S.W.

TO CORPORATIONS, GAS ENGINEERS, AND OTHERS.

HENRY ALDER,

GRANGE METER-WORKS, EDINBURGH,

Begs to intimate that he is the ORIGINAL MANUFACTURER of

DRY GAS-METERS IN CAST-IRON CASES.

The Meters are protected by Registration on the 17th of December, 1864, under the "Copyright of Designs Act."

They are much more durable, and at the same time more easily repaired than those in Tin Cases.

PRICE LIST AND TERMS ON APPLICATION.

Agent for Ireland—Mr. J. FURNESS, 3, Fownes Street, DUBLIN.

CAROLINE VICKARY,

(ADMINISTRATRIX TO THE LATE JOHN VICKARY,)

GAS ENGINEER, CONTRACTOR, IRON AND BRASS FOUNDER,

EXE ISLAND, EXETER,

(Established Thirty years,)

Respectfully tenders her thanks to those friends who have patronized her since her late husband's death, and having secured an efficient staff for each department of design and manufacture, she refers with confidence to works recently erected by her as a guarantee that all orders she may be favoured with will be completed in a sound and satisfactory manner.

GASHOLDERS AND TANKS,

Retorts, Retort-Fittings, Condensers, Scrubbers, Purifiers, Station-Meters, Governors, Sluice-Valves of all kinds. (Gas and Water Mains always in stock.)

GAS-FITTINGS,

Including Chandeliers, Pendants, Hall Lamps, Brackets, Star and Sun Lights of all designs, embracing the Mediæval and other periods.

GAS-METERS (WET OR DRY),

Combining the most recent improvements in principle and manufacture; upwards of 150,000 already in work, giving the highest satisfaction. (A guarantee for five years given with each one.)

Every description of **Plumbers Work,** comprising **Water-Closets, Beer-Engines, Lift and Force Pumps, Cocks for Gas, Water, or Steam, &c.**

Drawings, Specifications, and Estimates of **Gas-Works, Iron Roofs, Bridges,** and light or heavy structures in wrought or cast iron, supplied on application.

Trade Mark. **THE MEDAL FOR 1862.**

THE ONLY PRIZE MEDAL AWARDED FOR TUBES AND FITTINGS.

CROWN TUBE-WORKS,
WEDNESBURY, STAFFORDSHIRE.
WAREHOUSE—81, UPPER GROUND ST., LONDON.
JAMES RUSSELL & SONS,
Patentees and First Makers of Wrought-Iron Tubes.

INTERNATIONAL EXHIBITION, 1862.
CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and "HONOURABLE MENTION" for good quality of Fire-Bricks.
WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

HANCOCK'S INDIA-RUBBER GAS-TUBING.
All sizes, from ¼ in. to 4 in. diameter and upwards.
Also,
HORSE SINGEING APPARATUS, best make, with GAS-BURNERS, COMBS, and INDIA-RUBBER TUBING, all complete.
INDIA-RUBBER BAGS for GAS-MAINS.
WASHERS for GAS and STEAM JOINTS.
VALVES (pure solid Rubber) for STEAM-ENGINES.
PACKING (Elastic) for STEAM-ENGINES.
FLANGE TUBING, for excluding Draughts and Dust through WINDOWS, DOORS, and GLASS CASES.

Section.

Illustrated Price Lists on application.
JAMES LYNE HANCOCK,
Vulcanized India-Rubber Works,
GOSWELL MEWS, AND 266, GOSWELL ROAD,
LONDON, E.C.

Established 1811.
READY & SON,
BILSTON STREET BRASS FOUNDRY,
WOLVERHAMPTON
MANUFACTURERS OF
SUN BURNERS, GAS CHANDELIERS,
HALL LANTERNS, BRACKETS, PENDANTS,
And every Description of
GAS-FITTINGS,
Including
MEDIÆVAL FITTINGS FOR CHURCHES, &c.
Large Pattern-Books complete, with Book of Prices, 7s. 6d.

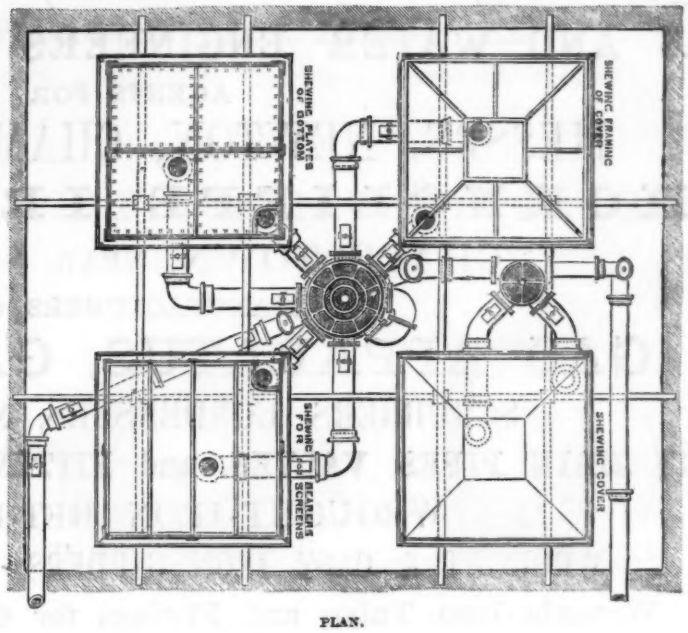
JAMES M'KELVIE,
CANNEL COAL MERCHANT,
HAYMARKET,
EDINBURGH.
Established 1840.

HOPKINS, GILKES, & CO.,
LIMITED,
MIDDLESBOROUGH,
SUPPLY GAS & WATER PIPES of EVERY SIZE.
Plain, Turned and Bored, and Coated.
CAST-IRON RETORTS.
Castings for Gas-Works of every description.
EXHAUSTERS.
LONDON OFFICE: 95, CANNON STREET.

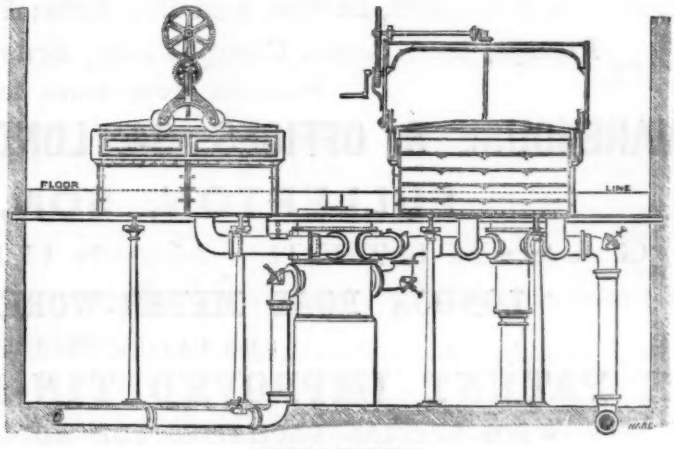
TO GAS ENGINEERS AND FITTERS.
Every Description of
GAS LANTERNS AND REFLECTOR LAMPS
For Shop Windows kept in Stock.
W. DAVIS, 17, Wells Street, Oxford Street, LONDON, W.
Established 1820.

J. T. B. PORTER & CO.,
GAS ENGINEERS,
MANUFACTURERS AND CONTRACTORS FOR GAS-WORKS
Of any extent at Home and Abroad,
GOWTS BRIDGE WORKS, LINCOLN,
AND
JOHN STREET, ADELPHI, LONDON, W.C.

A PLAN & ELEVATION OF GAS PURIFIERS
WITH
COCKEY'S PATENT VALVES.



PLAN.



SECTIONAL ELEVATION.

DESCRIPTION OF PURIFIER ARRANGEMENT.

The plan shows four Purifiers: three of them are worked in rotation by means of a central Valve, so that two are always in use, and the third always out of use for cleaning. By another arrangement of the Valve, either one, two, or three Purifiers may be used together.

The fourth Purifier is used as a guard, with a separate Valve, and is useful in preventing any slightly impure gas, which may have escaped in turning the central Valve, passing in that state to the gasholder.

This system has been found to work well in many gas-works, and in addition to the advantage before stated, it affords a ready and convenient mode of using oxide and lime together for purifying.

By the introduction of a bye-pass, the system is made more perfect, inasmuch as the central Valve, with its connected Purifiers, may be shut off for repair, and the gas passed temporarily direct to the fourth Purifier.

The Valves which are here introduced have now been in use for more than ten years, and have been tested in sizes varying from 3-inch to 16-inch. The increasing demand for them is the best proof which can be given of their satisfactory working and general usefulness.

More than 350 of them have been fixed. They are suited for various parts of gas apparatus, and are especially available for bye-pass connexions. They are also introduced with much advantage for the inlet and outlet connexions of gasholders, and simplify very much the changes where more than one gasholder is in use.

They are durable and easily reground without removal from their connexions, and in a few hours they may be made as good as new after many years wear.

The patentees are prepared to furnish plans, specifications, and estimates, either for the entire construction and erection of gas-works, or for the rearrangement of any part of the apparatus. The Valves are manufactured at the works, at Frome, where also Gasholders, Purifiers, Steam-Engines and Exhausters, Governors, and all other descriptions of Gas Apparatus are made and supplied.

EDWARD COCKEY & SONS.

THE IRON-WORKS, FROME SELWOOD,
March 1, 1869.

THORNELOE AND COMPANY,

34, LONDON WALL, CITY, E.C.,

GAS AND WATER ENGINEERS AND CONTRACTORS.

AGENTS FOR

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS,

CHAPELTOWN, NEAR SHEFFIELD,

MANUFACTURERS OF

GAS APPARATUS, GASHOLDERS,

SCRUBBERS, CONDENSERS, & PURIFIERS;

IRON MAIN PIPES, VALVES, and FITTINGS for GAS and WATER;

WROUGHT-IRON RETORT-LIDS;

WROUGHT & CAST IRON GIRDERS, BRIDGES, PIERS, &c.

Wrought-Iron Tubes and Fittings for Gas, Water, and Steam;
Chandeliers, Pendants, Lamps, and Brackets; Plumbers Work, Water Closets,
Pumps, &c.; Lead, Composition, Brass, and Copper Tubes;

Supplied from Stock at the

WAREHOUSE & OFFICES, 34, LONDON WALL, CITY, E.C.

FULLERTON, SON, & CO.,

GAS-METER MANUFACTURERS,

LONDON ROAD METER-WORKS EDINBURGH,

SOLE MANUFACTURERS OF

THE PATENT IMPROVED TIN-PLATE DRY METER,

WITH SPECIAL FACILITIES FOR ADJUSTING AND REPAIR,

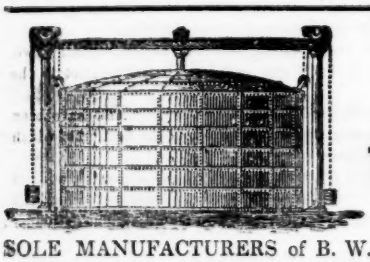
The principal parts of the mechanism being accessible by the removal of a single screw.

GAS-METERS on the WET and DRY principles made in CAST-IRON and TIN-PLATE CASES.

STATION-METERS, GOVERNORS, EXPERIMENTAL & TEST METERS, GAS APPARATUS, &c.

LONDON AGENTS: THORNELOE & CO., 34, London Wall, City, E.C.,

Where Meters are supplied to order from Stock.



IMPROVED GAS APPARATUS,

FOR CITIES, TOWNS, VILLAGES, &c.,

INVENTED AND MANUFACTURED BY

W. C. HOLMES & CO.,

WHITESTONE IRON-WORKS, HUDDERSFIELD.

SOLE MANUFACTURERS of B. W. THURSTON'S IMPROVED SCRUBBER, CONDENSER, and WASHER, in use in many of the principal Gas-Works on the Continent.

PATENTEES of the IMPROVED COMBINED PURIFYING APPARATUS, so eminently adapted for Exportation.

ESTIMATES, PLANS, and SPECIFICATIONS PREPARED for BUILDINGS and APPARATUS.

Prospectus, Price Lists, &c., on application.

LONDON OFFICES—57, GRACECHURCH STREET, CITY.

*** *Please address letters to Huddersfield.*

REFERENCES TO NEARLY 300 GAS-WORKS.

TANGYE BROTHERS & HOLMAN,

ENGINEERS, MACHINERY AGENTS, AND MANUFACTURERS,

10, LAURENCE POUNTNEY LANE, LONDON, E.C.;

And BIRMINGHAM (TANGYE BROTHERS), CORNWALL WORKS, SOHO.

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS.

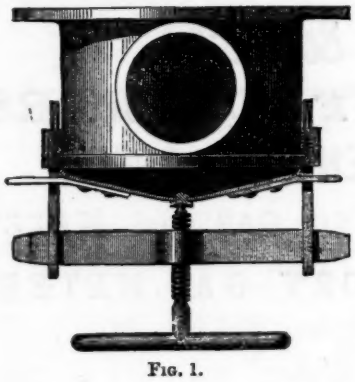


FIG. 1.

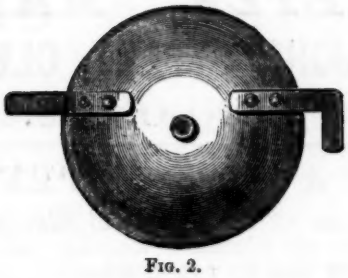


FIG. 2.

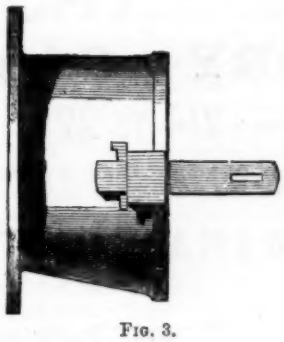


FIG. 3.

Several Hundreds in successful operation in various Gas-Works.

The expensive and cumbersome process of sealing the mouths of Gas-Retorts by means of luting the Lids with lime and other materials hitherto used for that purpose, is henceforth rendered unnecessary, and will be superseded by the very efficient method shown in the accompanying illustrations.

Fig. 1 shows a plan of a mouthpiece with Morton's Patent Lid in section. The mouthpiece is faced true, and the projecting circular edge or periphery of the lid is also turned true, and, by preference, of a semicircular section, so that the point of contact is reduced to a minimum; the convex form of the Lid rigidly sustains the force of the screw, which, by its central action, gives the Lid a uniform bearing, and effectually seals the mouth of the Retort.

Fig. 2 shows a front view of Morton's Patent Lid, which is stamped out of plate iron, having (in this case) ledges to rest on the lugs of the mouthpiece; these Lids, however, are more generally fitted to hinged cross-bars, by which means they remain suspended while the charge is withdrawn and the Retort charged, so that the damage done by throwing them about is entirely prevented.

The advantages obtained are—

1st. The sound sealing of the Retort during the whole time it is carbonizing the charge of coal, there being no jointing medium between the Lid and the mouthpiece.
2nd. The improved condition of the coke by the non-mixture of lime.
3rd. The Lid requires no preparation on the part of the stoker, beyond slightly scraping the surface to remove extraneous grit or dirt.
4th. The Lids are only about two-thirds the weight of the old form in general use, a Lid for a 16-inch mouthpiece weighing a little over 20 lbs.
5th. The Self-sealing Lid reduces labour, saves wear and tear, obviates all the inconvenience and discomfort consequent on the preparation of luting, and effects a great reduction in the working expenses. The cost attending the process of "luting" in several large gas-works, exceeds £1000 per annum, ranging in various works from 20s. to 35s. per mouthpiece.

It will be obvious that a round Lid is the most convenient and the cheapest form. D Retorts are adapted for round Lids, by carrying the bottoms down the necessary depth for that purpose, as shown in Fig 3. Some mouthpieces have been thus adapted, and are in use at the Chartered Gas-Works.

The following testimony speaks in favourable terms after ample and careful test:—

Burslem and Tunstall Gas Company, Longport, Staffordshire, Oct. 12, 1869.

Dear Sir,—In reply to your favour of the 9th inst., I have pleasure in stating that my admiration for your Patent Retort-Lid is most unqualified. I have 14 of them in use, and have tested them in the severest manner possible at these works, but without being able to detect the slightest defect. Yesterday the strap slipped off the exhauster, and a pressure of 13 inches was thus almost instantly thrown upon the Retorts, but although many of the luted Lids were leaking, not the slightest escape was observable from yours. I had anticipated that at least some greater degree of care would have been required in the scraping of the mouthpieces after the drawing of each charge, but even in this particular I find that labour has been reduced.

By every stoker on these works, as well as by myself, your Lids are regarded as a boon.

Please send me 30 more at your earliest convenience.

R. Morton, Esq.

I am, &c., (Signed) HENRY WOODALL.

Chartered Gas Company, Horseferry Road, Westminster, Sept. 15, 1869.

Dear Sir,—I have only lately returned to town, which is the reason I have not replied earlier to your inquiry.

I beg to say that I have had your Lids in use for upwards of two months, and during that time they have always kept a perfectly sound joint. I may add that where your lids are used only one set is required.

R. Morton, Esq.

I remain, &c., (Signed) G. O. TREWBY.

Chartered Gas Company, 146, Goswell Street, E.C., Oct. 20, 1869.

Dear Sir,—I have much pleasure in stating that, after some months trial of your Retort-Lids, I find them everything I could desire. I consider the plan a great improvement.

R. Morton, Esq., London Gas Company.

I am, dear sir, yours truly, (Signed) A. UPWARD.

These Lids are in successful use at the London Gas-Works, the Chartered Gas-Works, the Dublin Gas-Works, the Burslem and other Works, giving great satisfaction.

Application for Licences and other Information to be made to

TANGYE BROS. & HOLMAN, 10, Laurence Pountney Lane, London, E.C.

Sole Makers of Upward's Patent Safety Drilling Apparatus, Weston's Patent Differential Pulley Blocks, the "Special Steam-Pump," the Patent Duplex Lever Punch, &c.

London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

PATENT WET AND DRY GAS-METER MANUFACTURERS, &c., &c.,

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

PATENT IMPROVED WET METER.

W. P. and Co. invite especial attention to this Meter, which entirely overcomes the difficulty to which ordinary Wet Meters are subjected, owing to the short range of the Float, which is necessary, in order to meet the requirements of the Sales of Gas Act.

"It is well known that in Meters constructed so that the valve will close when the water is drawn off to such a point as to render them 3 per cent. slow, the lights are liable to be extinguished by the closing of the valve by a sudden increase of pressure. To meet this difficulty, Mr. Pinchbeck has invented an ingenious and simple arrangement by which the action is reversed, and any such increase of pressure, in his Meter, raises the valve instead of depressing it. The fact of the improvement having been adopted by Messrs. W. Parkinson and Co. is a sufficient guarantee that it practically and effectually remedies the inconvenience it is designed to meet."—JOURNAL OF GAS LIGHTING.

PATENT IMPROVED DRY METER,

Which W. P. and Co. pledge themselves to manufacture with the same quality of materials and workmanship as in their Wet Meter, thereby giving Gas Companies and others the advantage of procuring a first-rate Dry as well as a Wet Meter, which, hitherto, they have been unable to do.

STATION-METERS AND GOVERNORS,

Which can be seen at all the London Gas-Works; also at Liverpool, Manchester, Sheffield, Nottingham, Belfast, Glasgow, Birmingham, Dublin, Bristol, Leeds, Leicester, Brighton, Southampton, Sunderland, Wolverhampton, Bradford, Norwich, &c., &c.

TEST GASHOLDERS, EXPERIMENTAL METERS, EXHAUSTER REGULATORS,

MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

CONTENTS.

Notes upon Passing Events:— PAGE
Dr. Letheby's Report on the Sanitary Condition of the City of London . 115
Mr. Haywood's Report on the Railway and other Projects affecting the City of London 116
The Attacks on the British Railway System. 116
Mr. J. Harrison's Paper on Railways at the Institution of Civil Engineers 117
Amateur Discourses on Engineering 117
Mr. Morley, M.P., on the Cultivation of Waste Lands 117
Macadamizing in Islington 117
Final Discussion at the Metropolitan Board of Works on Water Supply. 117
New Gas Projects 117
Circular to Gas Companies:—
Amalgamation of the Chartered and Victoria Docks Gas Companies . . 117
Information against the Sheffield Corporation for an Injunction to Restrain them from Applying the Borough Funds for Prosecuting Gas and Water Bills 117
Death of Mr. Edwin Unwin, of Sheffield. 118
Refusal by the Leeds Gas Companies of the Offers of the Leeds Corporation to Purchase their Works. 118
A Justice of the Peace summoned for Gas-Rent 118
The Report of the Chief Gas Examiner on the Quality of Gas supplied during the last Quarter in the City of London 118
Correspondence:—
The Purifying Apparatus at the Beckton Gas-Works 118
Parliamentary Intelligence:—
Progress of Bills in House of Lords. 118
Progress of Bills in House of Commons 118
Dr. Stevenson's Report on the Gas supplied to St. Pancras, in Jan., 1870 . 118
Legal Intelligence:—
Southampton Petty Sessions—Summons for Non-payment of Gas-Rents . 119
Belfast Police Court—Prosecution by the Belfast Gas Company . . . 119
Dundee New Gas Arbitration 120
Miscellaneous News:—
Meeting of the City of London Gas Company 125
Meeting of the Chartered Gas Company 129
Meeting of the Imperial Continental Gas Company 129
Meeting of the Cambridge Gas Company 130
The Cambridge Gas and Water Companies Valuation and the Assessment Committee 131
Meeting of the Cambridge Water-Works Company 131
Meeting of the Walton-on-Thames and Weybridge Gas Company . . . 131
Death of Mr. Edwin Unwin, of Sheffield 132
Metropolis Gas Supply—Dr. Letheby's Report on the Gas supplied to the City of London for the Quarter ending December 31, 1869 132
Metropolis Water Supply—Metropolitan Board of Works 133
Professor Tyndall on Dust and Disease 136
The Water Supply of Paris 137
Dr. Whitmore's Report on the Quality of the Water supplied in St. Marylebone, in December, 1869 138
Dr. Whitmore's Report on the Quality of the Gas supplied in St. Marylebone, in December, 1869 138
Return by the Metropolitan Association of Medical Officers of Health of the Average Composition and Quality of the Metropolitan Waters, in January, 1870 138
Return by the Metropolitan Association of Medical Officers of Health of the Average Composition and Quality of the Metropolitan Waters, for the Year 1869 138
Dr. Frankland's Analysis of the Metropolitan Waters, in January, 1870 . 138
Register of New Patents:—
Applications for Letters Patent 139
Grants of Provisional Protection. 139
Invention Protected for Six Months. 139
Notices to Proceed 139

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

A Gas Director.—*A board may lawfully appoint a sub-committee of its members to conduct the affairs of the company, but all the proceedings must be submitted for confirmation to the whole board before they can be legally acted upon.*

An Inspector.—*We have so often unsuccessfully proposed the formation of a benefit society for decayed officers of gas companies, that we fear no good would result from a renewed attempt to form such a society.*

E. A. W.—*We are not aware of any case in which compensation has been given by Statute to the officers of a company whose works have been sold to the local authorities. There are, however, several instances in which, on the amalgamation of two companies, compensation has been granted to the officers whose services were no longer required.*

NOTICES.

The subscription to the Journal is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders should be made payable at the Money-Order Office, London, to William B. King, 11, Bolt Court, Fleet Street, by whom the business department of the Journal is conducted.

SCALE OF CHARGES FOR ADVERTISEMENTS.

Six lines and under . . . . . 3s. 0d.

Sixpence per line for every line additional.

Special contract for advertisements intended for continuous insertion.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

The next number will be published on Tuesday, March 1, and the subsequent numbers on each successive alternate Tuesday.

This Journal has been duly registered at the General Post-Office for transmission abroad.

All communications for the Editor to be addressed, "No. 42, Parliament Street, Westminster;" and all remittances for subscriptions or orders for advertisements to the Publisher, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, FEBRUARY 15, 1870.

Notes upon Passing Events.

Dr. Letheby's Report on the Sanitary Condition of the City of London, contains some facts and conclusions of more than ordinary interest. Those who are prepared to study the important tables which it contains, will refer to the original. On a table showing the annual birth-rate and death-rate per 1000, and the calculated death-rate of fourteen important towns, Dr. Letheby says: "The observed death-rate is always very different from the "true death-rate. Dublin, for instance, which has an observed "death-rate of only 23·81 per 1000, is, nevertheless, an exceedingly unhealthy city—much more so than Leeds, with an observed death-rate of 27·26 per 1000; for the latter, considering "the number of children in the place, has a death-rate but "slightly above the estimated death-rate; while the former, with "its small proportion of children, has a death-rate excessively "above it (16·29)." Mr. Andrew Watt, of Montreal, has exposed, in a pamphlet, the fallacies of the Registrar-General, Mr. Edwin Chadwick, C.B., and others of his school of quacks, who rely on the death-rate of a town to show its real sanitary state. To ascertain the relative health of the inhabitants of any number of places, allowance must be made for the difference in birth-rate, as well as for the difference in increase by immigration. The remaining difference in the rate of mortality will express the relative health of the people. The death-rate of children contributes largely to the total mortality; it amounts, during the first year of their age, to about 160 per 1000 of all that are born, while in the rest of the population the mortality is only about 20 per 1000. In consequence of his systematic neglect of these conditions of life, the statements of the Registrar-General, in his weekly return of births and deaths in London, as to the death-rate per 1000 of the population in nineteen large towns of the kingdom, are worse than useless. They are misleading, and must take rank with Dr. Frankland's sensational calculation of tons of solid matter in the metropolitan drinking waters. For example, a town which had no important manufactures or commerce to attract immigrants, and no large number of married people in the prime of life, would, in its state of healthy stagnation, have few births, and consequently few deaths; but a mining town, in which there was a constant demand for labour, would swarm with children. Thus, "A place with only 30 per 1000 of the population under a year old must have a lower death-rate than "another place with 60 per 1000 of the population at that age, "for—

	Deaths.		Deaths.
30 infants at a mortality of 16 per cent. =	4·8, and	60 infants =	9·6
970 persons " 2 " =	19·4, and	940 persons =	18·8
1000 of such a population . . . . . =	23·2, and 1000 " =		28·4."

According to the returns prominently put forward by the Registrar-General in his last quarterly report, it would seem that Dublin, with a death-rate of 22·72 per 1000 of the population, must be considerably more healthy than Liverpool, with a mortality of 27·29 per 1000. In reality, it is the reverse; for, if measured by the birth-rate as well as the death-rate, it will be found that Liverpool is in a better sanitary condition than Dublin. Dr. Letheby shows in figures that in the City of London, under ordinary circumstances, although the cause of death may be different, the per centage of deaths is the same, and this rule applies to all cities. Thus, "In 1859, the most fatal of zymotic "diseases were small-pox, measles, and scarlet fever; in 1860, "the small-pox prevailed; in 1861, measles, whooping-cough, "and croop; in 1862, it was continued fever, whooping-cough, "and croop; in 1864, scarlet fever and measles; in 1865, "whooping-cough and croop; in 1866, alvine disorders and fever. "After that there was a lull in two comparatively healthy years, "1867 and 1868, and then, in 1869, there was an epidemic of "scarlet fever. Seasons have a considerable effect on the "severity of these diseases. Scarlet and other fevers are most "fatal at the close of summer and throughout autumn, and "least fatal in winter. Alvine disorders are most acute in summer time, and least in winter; small-pox, measles, whooping-"cough, and croop, are most prevalent in the spring of the year. "So, too, with tubercular diseases. Winter is the most fatal "period for phthisis, summer for tabes and scrofula, and spring "for hydrocephalus." In Dr. Letheby's report on the water supplied to the City, he treats at some length the question of hard and soft water, the subject, among the sensational school of sanitarians, of much claptrap. He says:—

For ten years I have, as your sanitary officer, made constant examination of the water supplied to this City, and I have remarked that, except in special cases, where soft water is required for manufacturing purposes, water of moderate hardness, like that supplied to the metropolis, to Paris, and Vienna, is always preferred, and is best suited for domestic purposes, because of its being brighter to the eye and more agreeable to the taste. This also is the opinion of the eminent *savans* who were appointed by the Governments of Paris and Vienna to decide on the quality of the water for those cities. So satisfied, indeed, were the French authorities on this head, that they passed by the soft waters of the sandy plains near Paris, and went far away to the chalk hills of Champagne, where they found a water which is even harder than that supplied to London. One important consideration which strongly influenced them in their decision, was the fact that more conscripts are rejected in the soft-water districts, on account of imperfect development and stunted growth, than in the hard; and they conclude that calcareous matter in water is essential to the formation of tissues. In this country, also, it is remarkable that wherever soft water is supplied to the people the mortality is large, even when allowance is made for the birth-rate of the place. Glasgow, for example, as well as Preston, Dundee, Sheffield, Plymouth, Manchester, Bradford, &c., which are all supplied with water of less than 4° of hardness, have a mortality which ranges from 26 to 34 per 1000; while at Birmingham, Bristol, Sunderland, Newcastle-on-Tyne, Wakefield, Dover, Norwich, Croydon, Worcester, Derby, and other places, where the waters are hard, the mortality is considerably less—in fact, it may be said that in towns supplied with water of more than 10° of hardness, the average mortality is about 22 per 1000, while in those supplied with softer water it is about 26 per 1000. And if we regard the subject from another point of view, there is the striking fact that, as three-fourths of the earth's surface is covered with calcareous strata, we are compelled to drink calcareous water, as if it were intended for a wholesome purpose; and it may well be, as the late Professor Johnston observed, that "the bright sparkling hard waters which gush out in frequent springs from our chalk and other limestone rocks are relished to drink, not merely because they are grateful to the eye, but because there is something exhilarating in the excess of carbonic acid they contain and give off as they pass through the warm mouth and throat, and because the lime they hold in solution removes acid matters from the stomach, and thus acts as a grateful medicine to the system. To abandon the use of such a water, and to drink daily in its stead one entirely free from mineral matter, so far from improving the health, may injure it." In fact, the water of a country may determine the diet of its inhabitants. The soft water of the lakes of Scotland, for example, may have had much to do with the use of brown meal; and but for the calcareous waters of Ireland the potato could not have become a national food. Looking, therefore, at the plain teachings of all this, and considering the excellent quality of the water supplied to the metropolis, it would be folly, in my opinion, to change it for a soft water.

On the other hand, it is quite possible to have an excess of calcareous and other saline matters, as is the case with the well waters of this City, where the proportion ranges from 48 to 120 grains per gallon; and, having regard for the sources of these substances, I have more than once reported that they are unfit for domestic purposes.

Dr. Letheby also touches on other subjects of considerable local importance, but less general interest.

Mr. Haywood has made his annual report to the Commissioners of Sewers, on the railway and other projects about to be brought before Parliament which affect the City. There are eleven projects noticed, some of which have already fallen to the ground. The Great Eastern proposes to abandon the high-level line which was to have extended the Shoreditch terminus to Broad Street, near the station of the North London. The directors now propose to construct a railway at about 18 feet below the street surface, forming, by a branch at Liverpool Street, a junction with the Metropolitan Tower Hill Extension, authorized in 1864. The Metropolitan Railway propose, apparently, to stop at Bishopsgate Street, and seek power to abandon the proposed line between Bishopsgate Street and Tower Hill; whether by arrangement with the Great Eastern does not appear. The Metropolitan District propose to carry out the extension to the Mansion House, which the Common Council have so vehemently opposed. It would be curious to ascertain what proportion of the £60,000, so promptly raised for the middle-class school in the City Road, was subscribed by the merchants and bankers who supported, and the Aldermen and Common Councilmen who opposed, this Mansion House extension and subway to the Royal Exchange. The project, as the City Engineer justly observes, looks as if the company were short of the funds needful for completing the inner circle. Should this be the misfortune—not the fault, mind—of the company, the surest mode of securing the eventual completion of the inner circle will be to give them the profitable station. To ask a company to make a line without money, is to be as unreasonable as an Egyptian taskmaster. If the City wants the extension, let the Corporation do as it did under the sagacious influence of Charles Pearson—head a subscription-list. The East and West Metropolitan Junction is, if we mistake not, the line projected without a board of directors to complete and improve the inner circle. We fancy this worthy idea has already passed into the limbo of good intentions. The Southwark and City Subway is a project for repeating the operation Mr. Peter Barlow has successfully carried out at Tower Hill—to cross the river by an iron tubular subway. It is to commence at the corner of Martin's Lane, Cannon Street, run beneath Arthur Street West, Swan Lane, and the river bed, to a point close to London Bridge steps, and be pushed on underground to a terminus at the corner of Blackman Street and Great Dover Street. It is intended to convey passengers by omnibuses, which will be moved partly by gravitation and partly by small stationary engines. The journey will occupy five minutes, and the fares will be very low.

The most novel and interesting projects are those for extending the system of street tramways authorized last session. Two rival companies are in the field, in at least one important instance proposing to occupy the same ground. One company proposes to use the national gauge of 4 feet 8½ inches, the other a wide gauge of 5 feet 3 inches. Both propose to start from Highgate Archway, and traverse Islington, both by Upper Street and Liverpool Road. Lines are also projected from the Edgware Road to Oxford Street, joining a Tottenham Court Road branch, and continuing along New Oxford Street and Holborn to Farringdon Road, and from Kentish Town to King's Cross, Farringdon Street, Blackfriars Bridge, and so on to Belvedere Road, near Westminster Bridge; from the Goswell Road to St. Martin's-le-Grand, and other branch lines; also from Seven Sisters Road (Finsbury Park) to Camden Road, Hampstead Road, and Oxford Street; and other extensions of lines in course of formation from Whitechapel Church. The rails are to be at the same level as the street. Animal power only is to be used, and the use of the tramway is reserved exclusively to the companies for two or three years from the opening. The fares are to be a penny a mile, and the company may fix a minimum fare of threepence for any distance. Two carriages must run daily for artisans at a halfpenny a mile, with a minimum fare of one penny. Mr. Haywood, who has had the advantage of travelling on street tramways in America and Canada, as well as in all the cities of Europe where they are laid down, reports:—

They exist to a large extent in New York, Chicago, St. Louis, Philadelphia, and indeed every large town in the United States; in fact, one of the first things done in any part of America, where a population has aggregated to about 20,000 people, is to lay down a system of street railways, such as those now proposed in the metropolis. In the large towns referred to, although there are cabs and other vehicles for public hire, they are but few in number, and comparatively little used, and the street railways are almost exclusively used by all classes. In Toronto, Montreal, and other towns in Canada, there are similar street railways, and they exist at Valparaiso, Nova Scotia, St. Petersburg, Vienna, Berlin, Brussels, Copenhagen, Hamburg, and Geneva. There is a line from Paris to St. Cloud and Versailles, which has existed some years; there is a line at Birkenhead, and a short length also at Manchester; a considerable length is laid at Liverpool, and extensions are now being made there. There is also a similar tramway in the Potteries. Street tramways having been introduced into many of the largest towns of Europe, it is surprising that so long a period should have elapsed before they had at least a full and fair trial here; for the greater the population, the greater their convenience will in most respects be. On the other hand, the narrowness of some of the important thoroughfares, the occupation of the soil by gas and water companies, and the large traffic, offer difficulties in the way of their construction and maintenance, which do not exist to a similar extent in other cities. Great difficulties have, however, been overcome in the construction of railways and other engineering works; and we should not have had the benefit arising from them, had every obstacle in their way, or had every objection which could be raised against them, been sufficient to prevent their construction. Objection can, undoubtedly, be raised against street railways, but they may perhaps be vanquished.

These are the guarded words of an engineer evidently deeply impressed with the necessity of concentrating the traffic of the metropolis in fewer vehicles, and of conveying it along the lines of shops and warehouses at whose doors passengers wish to stop. He also foresees the time when these lines may be used at night, or other convenient time, for the conveyance of heavy merchandise. But he knows that he is addressing gentlemen painfully opposed to innovation, and morbidly jealous of an encroachment on local powers; he has, therefore, to speak to them in tones as soothing as if he were a pupil of Rarey approaching a timid and half-broken horse. No doubt it would be a better municipal arrangement if the authorities who have charge of the pavements were to make these tramways at their own expense, and levy tolls on the companies that worked them. But to get the district Boards of the metropolis to agree on an engineering and financial plan would take a quarter of a century. In the meantime we continue to be worn out and taxed by the difficulties of traversing London. If a network of tramways be completed, post, parcel, and telegram delivery might be facilitated by it. We can imagine an admirable system of parcel delivery by tramway.

Attacks continue to be made on the British railway system, on absolutely contradictory principles. One and sometimes the same set of people complain that railways pay low dividends to shareholders, that they are too expensively constructed, that fares are too high, and that there are not enough trains daily; forgetting that low dividends have been created by two causes—the increase of railway accommodation (sometimes a needless increase) and the cost inflicted on companies by the English system of unlimited compensation for injuries real or imaginary. If the English people would be content with Belgian pace and Belgian accommodation, they might have something very like Belgian fares; but then they could neither have three sets of railways running to and from Manchester every day, nor three sets of railways to bring coal to London every day. There is at this moment an agitation going on to obtain workmen's trains at low rates morning and evening—a very proper object, because it would enable workmen to live in better air at lower rents. But the agitators are not content with honest arguments. One claptrap point is that the Midland Railway destroyed, to make its terminus, a large number of workmen's lodging-houses. Any man of sense and honesty would admit that the Midland Railway, by establishing a

metropolitan terminus, has, in the demand for labour it has created, and the facilities it has established for coal trade in winter, far outbalanced any injury done by sweeping away cottages in St. Pancras. How glad would the Parisians be if their monopolist railway companies would make their stations as accessible as Broad Street and Moorgate Street make the Great Western, the North-Western, the Midland, and the Great Northern. One working man, corresponding with that useful paper, the *Echo*, dates from Walthamstow, and, while he complains that he has to walk to his work from that distant and benighted region, objects to limiting the liability of companies to £100 for each passenger in case of accident. Such people do not want accommodation, but a grievance. Why does he live at Walthamstow, of all places round London the most inaccessible? It would not pay a railway to smash a train of five hundred men at £100 a piece, but a hundred claims at £2000 each would make an item in a balance-sheet for costs alone. Workmen's trains there ought to be, but not without limited or compulsory insurance. It ought not to be forgotten that the high rents of workmen's houses are partly owing to the little work (one-third less than ten years ago) that mechanics and the building trade do for wages one-fourth higher.

Mr. John Harrison read a paper this month, at the Institution of Civil Engineers, which contains some interesting and suggestive facts and figures. Five hundred millions have been invested in railways in this country, which give a return of twenty millions, or 4 per cent. per annum, to shareholders, while adding incalculably to the resources and the convenience of the country directly in passenger and raw and manufactured produce, as well as indirectly in postal and telegraph facilities. The National Debt is seven hundred and fifty millions, and only pays twenty-six and a half millions of income of unproductive capital. In 1849 our railway investments amounted to rather more than two hundred millions, and about that time, if the Chadwickian school had prevailed, railways would have passed into the hands of Government to be managed, like the dockyards and the army; with what chance of operations which, since 1849, have increased our railway facilities 54 per cent., or to over five hundred and two millions, it is easy to imagine. In this time the general traffic has increased 240 per cent., and the goods traffic 400 per cent., on a capital expenditure of 120 per cent. This increase of goods traffic is a measure of national advantage, derived from increased facility of conveyance, created by the energy of private enterprise, in spite of some mistakes, like the competition between the two gauges. It is the opinion of Mr. Harrison that many lines might be constructed at a cost of from £3000 to £5000 a mile, provided the landowners would sell their land at market value, that the Board of Trade would allow level crossings, and that gradients as steep as one in twenty or one in thirty were adopted.

What odd crotchets purely literary men get into their heads now and then on practical questions! We do not refer to Mr. Ruskin, whose eloquence reminds one of iced punch—delicious on certain occasions, but poisonous as daily drink. We refer to a certain widely circulated journalist who occasionally discourses on engineering questions. For instance, an evening journal of large circulation and authority on politics and literature, discoursing on the inconvenience of Temple Bar, repeats an old fallacy that mud spews up between the City paving-stones, and so loosens them. As the paving of the City is all laid on several inches depth of concrete, this is impossible; indeed, stones are often crushed and worn, not loosened. The mud referred to falls from above in soot and dust, and is brought into town on wheels and the feet of foot-passengers. One difficulty of the asphalting plan is the expense. The fact is, that the main thoroughfares of the City have to endure a degree of wear and tear for which no precedent is to be found, unless it be along the quays of Liverpool.

Mr. Morley, M.P., is a most respectable merchant and manufacturer, lavish in his charities, and zealous in his peculiar religious views, but about the history of agriculture in this country he is profoundly ignorant. Lord John Manners, Mr. George Odger, or any other professor of claptrap, could not have earned a cheer from working men by a more mistaken and mischievous assertion than that there were millions of waste lands in this country fit for cultivation by men willing to become emigrants. Of all speculations, the reclamation of waste lands is one of the slowest to make a return, if ever. A correspondent of the *Times*, under the signature of "H.," shows the statistics of the question:—

> England (the forty counties) contains 32 million acres, and by this time at least 22 million people. Half these people probably live on imported produce. Yet the lowest estimate of the cultivated land I have ever seen was 23 million acres. There would remain 9 millions. Out of these we must take river courses, canals, roads of all kinds, the space covered by towns and villages, perhaps altogether 600,000 acres. Then there are woods and forests, which I suppose it would not do to clear away. Then there are large tracts of "common," producing, perhaps, in natural grass as much as they ever would in any way; and, lastly, large tracts of mountain and moor in the north, and again in Cornwall, which would never repay cultivation. I doubt whether half a million of acres can be profitably added to what is already under cultivation in England. As to the wilder parts of Scotland and Wales, let any one go and look, and he can form his judgment. As to Ireland, every one might, I should think, allow that population is thick enough there.

The *Journal of the Royal Agricultural Society* contains numerous exact records of the operation and cost of reclaiming waste lands. Under the most favourable circumstances, it takes three years, and costs £20 an acre—often £40—before a corn crop can be grown. The best results have been derived from creating pasture. Periodical famines affected many Scotch districts before the crofters emigrated and sheep succeeded. The late Mr. Knight, the father of Mr. F. W. Knight, M.P., sank a quarter of a million on twenty thousand acres on Exmoor without any return. The moor has now returned to sheep. The great Norfolk and Lincolnshire reclamations would return to waste in three years of cultivation, without capital, so poor is the soil. These wild assertions divert public attention from the necessity of gardens and cow's grass for our rural labourers.

The surveyors of metropolitan parishes should go and look at a bit of macadam in Upper Street, Islington, levelled by one of Aveling and Porter's steam-rollers. Surely, it must be an economy to start with a flat surface, instead of with holes irregularly worn by traffic.

After a further discussion of two days, since we last reported, a majority of the Metropolitan Board of Works have been confirmed in their resolution to seek an interview with the Secretary of State for the Home Department to express to him their satisfaction with the report of the Royal Commission on Water Supply, and ask him whether or not it is his intention to bring in a Bill to carry out the recommendations of the commission—in other words, to ask him whether the Government intend to promote a Bill to transfer the water supply of the metropolis from the companies to the Board of Works. The answer of the Secretary can hardly be doubtful. Whatever may be Mr. Bruce's opinion as to the desirability of taking the supply from commercial companies, and conferring it upon a responsible municipal body, it cannot for a moment be supposed that the Metropolitan Board is the body he would think fit to be entrusted with the powers necessary to carry out such a gigantic change. If it were for an instant seriously believed that such a change was impending, we have no doubt the ratepayers of the metropolis would rise in a body to protest. We say this without expressing any opinion of our own as to the advisability or not of making the change, but merely to express what we believe to be the opinion of a vast majority of those whose interests would be affected by the operation. There are two aspects to the question. It may be regarded from a sentimental or from a financial point of view. It is, of course, highly desirable that a full and never-ceasing supply of water should be carried into every house, and the opinion of most of the speakers in Spring Gardens seemed to be that this should be done at any cost. The financial part of the question—that which is looked at with most interest by the constituents of the Board, and which involves an inquiry whether the Board can effect this full supply at the same or a cheaper rate than the companies, received comparatively little attention. The general notion appeared to be that water was a panacea for all the social and physical evils of a dense population, and must be supplied in plenty at any expense. This, however, is not the ratepayers view; and while every one is quite ready to insist on considerable alterations in our water supply, they will, nevertheless, require to be fully satisfied as to the cost of the change contemplated before it receives a general assent. With regard to the character of the debate we have reported at so much length, it is not too much to say that it showed the utter incapacity of the majority of the speakers to deal with a question of so much magnitude, and involving so many and diverse considerations.

Circular to Gas Companies.

An extraordinary general meeting of the Chartered Gas Company has been held to consider the provisions of the Bill which we have already announced will be brought before Parliament. It provides for the purchase of the Victoria Docks Gas Company, for which it has been agreed to pay £70,000. The meeting unanimously approved of the Bill. In allusion to the appeal pending against the decision of the Lord Mayor, the governor said he considered the proceeding justified by the fact that, since the conviction, the official referees have suspended the testing-places, in consequence of the whole of the apparatus, from the clock to the cubic foot measure, being in an unsatisfactory state. The wisdom of the appeal will, nevertheless, be doubted by the best friends of the company.

The legality of the application by municipal bodies of funds raised for special purposes to promoting gas and water Bills, is about being tested by the Sheffield Water Company, who have induced the Attorney-General to file an information against the Corporation of Sheffield, to which the town-clerk has been made

a party, for an injunction to restrain them from applying any funds raised by rates to promoting the Bills now before Parliament authorizing the purchase of the gas and water works by the Corporation. The information, an outline of which we borrow from a local paper, after reciting the steps taken by the Corporation, sets forth that they have already incurred certain expenses in the preparation of a Bill, and intend to incur further expense in promoting it. But as all the rates and funds of the Corporation are applicable to certain specific purposes, not including the expenses mentioned in this suit, it is contended that their application for this purpose is illegal. The rates and funds of the Corporation are enumerated, and appear to be—1. A borough-rate, applicable only to the purposes set forth in the Municipal Corporations Act; 2. A watch-rate, for certain special purposes only; 3. A bridge-rate, for certain special purposes; 4. A general district-rate, applicable only to the purposes of the Public Health Act; and 5. Certain receipts from fines and fees, the application of which to certain specific purposes is directed by Statute. Hence the informants allege that the expenditure of the rates in the promotion of the gas and water Bills is unauthorized and illegal, and an injunction is accordingly prayed to restrain the council from proceeding, and prayer is further made to condemn the Corporation in the costs of the suit. As the hearing of the case does not come on before the 17th inst., it would be imprudent in us to express any opinion on the question raised; but should the injunction issue, it will probably put a stop, except under extraordinary circumstances, to the transfer of gas and water works from companies to municipal corporations. It will be seen that the right to expend the ratepayers money in opposing gas and water Bills is not questioned in this case; but it will be remembered that in the Slough case the auditor disallowed all such expenses, and ordered them to be paid by the members of the Local Board who had signed the cheques for their payments.

Since writing the above we have learnt that the Corporation have taken the opinion of counsel as to the course to be adopted, and have been advised, in effect, that the borough funds and rates cannot be safely applied in payment of the expense of promoting a Bill; and if the Sheffield Bills are proceeded with, steps should be taken towards defraying the expenses by a subscription or guarantee of private individuals. This is proposed to be done, and at the same time endeavours will be made to obtain an alteration in the law on the subject.

The death is announced of Mr. Edwin Unwin, an alderman of Sheffield, but better known to our readers as the energetic managing director of the Sheffield United Gas Company. Mr. Unwin's health had been for some time failing, and he was recommended, about a month since, to come to London for the purpose of consulting Sir Henry Thompson. While here his complaint took an unfavourable turn, and after lingering for some days between life and death, he expired at his lodgings in Upper Wimpole Street, on Monday, the 7th. It was owing to the exertions of Mr. Unwin, in conjunction with Mr. Wake, the solicitor to the Sheffield Gas Company, that the law in respect of the illegality of breaking up public highways for the putting down of gas and water pipes without statutory powers, was clearly laid down by the Court of Queen's Bench; and the cause has ever since remained the leading case in the law text-books on the subject. We have reason to believe that the attitude assumed by his company, with regard to the proposed purchase of their works by the Corporation, will undergo no change in consequence of Mr. Unwin's death, and that no proposal from the Gas Committee of the Corporation will be entertained, unless backed by the approval of the council, and ratified by the consent of a public meeting of the town. An offer of the Gas Committee of 9 per cent. annuities for the 10 per cent. stock of the company has been declined; and unless the Corporation are stopped by the injunction prayed for, as mentioned above, from promoting their Bills, the question will have to be fought out in Parliament.

The Leeds Gas Companies have refused an offer of the Corporation to give them £142 for each £100 of 6 per cent stock, or 23¾ years purchase on their maximum parliamentary profits. Two or three months ago the stock stood at 118 in the market; but it has since risen considerably, on the liberal offer made by the Corporation having been made public. To enable the latter to pay the price they have offered without loss, they must raise the money at 4¼ per cent., which is below the rate at which English municipal bodies in the best credit are able to raise money.

Notwithstanding some opposition in certain quarters, it must be admitted that our "great unpaid" enjoy and deserve the general respect of the community. It is not without surprise, then, that we see a justice of the peace summoned before a petty session for the recovery of his gas account, and justifying his refusal to pay by the most frivolous and irrelevant excuses. This event occurred at Southampton on the 1st inst., when Mr. Thomas Hill, J.P., was summoned for the non-payment of a three-quarters gas bill, amounting to £145 2s. Mr. Hill's first objection was based on the refusal of the company to allow him 2½ per cent. discount, which they gave to three public bodies in the town, but to no private consumer. Seeing that the company have an undoubted right to give or refuse discount at their pleasure, this objection at once fell to the ground. The next objection raised by Mr. Hill—stimulated apparently by a discarded assistant gas examiner in London—was that the gas supplied by the Southampton Company was not equal in quality to that supplied to some other towns, and notably to the metropolis. On the part of the company, however, it was shown that the illuminating power of the gas was rather in excess of the standard required by their Act, and that they offered every facility for its examination. Under such circumstances the bench had no option but to make an order on Mr. Hill for the full amount claimed. The company waived all claim for costs.

In another place we publish the report of the chief gas examiner on the gas supplied to the City of London during the last quarter of the past year. It will be seen that on the whole the companies have satisfactorily fulfilled the requirements of the Act of 1868. As our readers know, a conviction has been obtained against the Chartered Company, against which an appeal has been lodged. The testings at the City testing-places have now, we believe, been resumed.

Correspondence.

THE PURIFYING APPARATUS AT THE BECKTON GAS-WORKS.

SIR,—We write to acquaint you that the Chartered Gas Company have placed the entire construction of the purification section of their new gas-works at Beckton in our hands, including all the scrubbers.

We should feel very much obliged if, in any notice or review of these gas-works in the JOURNAL OF GAS LIGHTING, you would have the kindness to mention the above fact. We received the entire order, without competition with any other firm, upon a fair price. The apparatus is arranged to work with our centre-valves upon a new arrangement. C. & W. WALKER.

Midland Iron-Works, Donnington, near Newport, Salop, Jan. 26, 1870.

Parliamentary Intelligence.

HOUSE OF LORDS.

FRIDAY, FEB. 11, 1870.

The following Bills were presented, and read a first time:—The BRECON GAS; CHILTERN HILLS SPRING WATER; LITTLEHAMPTON WATER; MANSFIELD WATER; NEWPORT (ISLE OF WIGHT) GAS; RAINHILL GAS AND WATER; ST. ALBAN'S GAS; SHOREHAM AND DISTRICT WATER; YEADON WATER; BIRMINGHAM WATER; BRIGHTON AND HOVE GENERAL GAS; CARDIFF GAS; CHESTER GAS; FYLDE WATER; GREAT CENTRAL GAS CONSUMERS; IMPERIAL CONTINENTAL GAS; RUNCORN, WESTON, AND HALTON WATER; ST. HELEN'S GAS; and the SOUTHPORT WATER.

HOUSE OF COMMONS.

THURSDAY, FEB. 10, 1870.

The following Bills were read a first time:—The ABERDARE GAS; BROUGHTY FERRY POLICE COMMISSIONERS; GASLIGHT AND COKE COMPANY; KING'S LYNN CONSUMERS GAS; LEEDS CORPORATION GAS; LEEDS CORPORATION GAS (PURCHASE, &C.); RUABON WATER; WREXHAM GAS; ROTHERHAM GAS; OLDHAM CORPORATION WATER, &C.; YEOVIL IMPROVEMENT; AIREDALE GAS; BUXTON GAS; HYDE LOCAL BOARD; KING'S LYNN GAS; NEWCASTLE AND GATESHEAD WATER; SHEFFIELD WATER; ECCLESHILL AND BOLTON GAS; ROTHERHAM AND KIMBERWORTH LOCAL BOARD OF HEALTH; SHIPLEY GAS; SHEFFIELD CORPORATION WATER; ABERDARE LOCAL BOARD; CLECKHEATON LOCAL BOARD; KIRKCALDY AND DYSART WATER; PAISLEY GAS; LEEDS GAS; READING GAS; READING LOCAL BOARD OF HEALTH; HALIFAX WATER, &C.; and the HEBDEN BRIDGE GAS.

FRIDAY, FEB. 11.

The following Bills were read a first time:—The DARTMOUTH WATER, and the ENNISKILLEN BOROUGH IMPROVEMENT.

DR. STEVENSON'S REPORT ON THE GAS SUPPLIED BY THE IMPERIAL COMPANY TO THE VESTRY OF ST. PANCRAS DURING THE MONTH OF JANUARY, 1870.

Date.	Number of Observations.	Average Light in Candles produced by 5 Ft. of Gas per Hour.	Light in Candles reduced to Consumption of 120 Grs. per Hour.	Traces of Ammonia.	Traces of Sulphuretted Hydrogen.
Jan. 1 to Jan. 13	Repairs in	room not complet	ed, after injury	from the	1st.
Jan. 14	10	12·5	14·3	Present.	None.
15	10	12·1	13·2	,,	,,
18	10	13·6	15·2	,,	,,
20	10	13·3	14·5	,,	,,
22	10	12·6	14·6	,,	,,
25	10	12·3	14·6	,,	,,
27	10	13·8	14·6	,,	,,
31	10	12·1	13·8	,,	,,

The examinations were made as usual according to the Gas Act, 1860, of which sections 7 to 12, 25 to 34, 37, 40, and 41 are now repealed by the 32 & 33 Vict., c. 128, and the illuminating power raised to 14 candles. The maximum illuminating power was 15·2 candles, the minimum 13·2 candles, and the average 14·3 candles. The gas was of about the usual quality. Had it been examined according to the most improved methods, its average illuminating power would have been raised to about 16½ candles, and this without any real increase of illuminating power. Ammonia was invariably present; sulphuretted hydrogen always absent. Sulphur, 18·46 grains per 100 cubic feet. THOS. STEVENSON.

Legal Intelligence.

SOUTHAMPTON PETTY SESSIONS.—Tuesday, Feb. 1.

(*Before Dr.* Hearne *and Major-General* Tryon.)

Mr. *Thomas Hill*, J.P. (who retired from the bench, and took a seat at the solicitors' table) was summoned for the non-payment of £145 2s., the amount due for three quarters consumption of gas at the Saccharum Works and Brewery, in the docks.

Mr. C. C. Smith (secretary to the company) appeared in support of the information, and said that perhaps it would save the time of the court if Mr. Hill would state at once what his points of defence were.

Mr. *Hill* replied that his object in appearing there was that the public might, if possible, reap some benefit by his resisting the claim. He should like Mr. Smith to make out his case first.

Mr. Smith then said that the claim was for £145 2s., being for the whole of three quarters consumption of gas at the Saccharum Works and Brewery, in the docks, and a balance of £2 5s., a deduction for discount made by Mr. Hill on the Lady-day quarter, and as far as he was at present aware, the only dispute was that Mr. Hill insisted upon deducting 2½ per cent. discount from his gas bills. Mr. Hill had been a consumer upon these premises since 1862, and up to 1869 they never had any dispute upon this question of discount, he paying his account the same as any other consumer. In 1869, however, he addressed a letter to the company, stating that if discount was deducted, a cheque should be drawn for the amount due, but on the company replying that this could not be allowed, a cheque for that quarter's gas, £33 16s. 3d., was paid. When the next quarter's account, £56 10s. 11d., was due, the collector called, and was handed a cheque for £54 5s. 11d., being told at the time by the clerk, who must have been under some misapprehension, that the discount had been agreed to, and the collector thereupon took the cheque tendered. The accounts for Midsummer and Michaelmas were rendered in due course, and on the collector calling he was told that if the discount was taken off a cheque would be drawn. The company charged 4s. per 1000 cubic feet, and he was in a position to show that, of something like twelve companies in London, ten were still charging this price, and some even beyond it.

Major-General Tryon: Mr. Hill does not dispute the charge.

Mr. Smith said he wished to show that the claim for discount had hardly any justification, because the company were selling the gas at so low a price that they could not afford to allow a discount. The directors were willing, when their finances permitted it, to reduce the price, so that the whole body of consumers might reap the benefit; but if they allowed discount to Mr. Hill, they would have to do it to some one else, so that it was not a question between him and the company, but between them and the public. For the Michaelmas account the collector again received a cheque, less the discount, but this was returned in a letter, informing Mr. Hill that the company still adhered to their previous decision. Up to Michaelmas, 1869, it was clear there was no dispute as to the quantity consumed, so that he presumed the court would only require evidence of the consumption from that time to the close of the period for which the amount claimed was due. The dispute with Mr. Hill involved perhaps a sum of £5 per year. He would remind the court that the company were not bound to supply gas, and therefore any arrangement which they might make with consumers was strictly of a private character, and there was nothing in their Act which authorized any person to say they must allow him discount whether the company willed it or not. Holding the position which Mr. Hill did, the company had put the matter off from time to time, and had done everything in their power to induce Mr. Hill to pay; but as these efforts were ineffectual, they were really compelled to come to that court to enforce payment of the claim.

Mr. *Hill* said he did not wish to occupy the time of the court, but he should like to ask Mr. Smith some questions upon what he had stated.

The Clerk (Mr. Eldridge): Is the amount admitted?

Mr. *Hill:* Not yet. There was a cheque given for £58 16s. 3d., which was returned. Why was that returned?

Mr. Smith: Because you deducted the discount.

Mr. *Hill:* But if the account was rendered to the dock company instead of to me, would it not have been the correct amount?

Mr. Smith replied that they could not go into what they did with any other company.

Mr. *Hill:* I only want an advantage which others are getting.

Mr. Smith contended that Mr. Hill had no right to cross-examine him as to what the gas company did with any one else. They had never entered into an arrangement with him to allow him discount, and until he could show their consent to it he could have no legal claim to the reduction.

Mr. *Hill:* But I may have a moral claim. Then you refuse to answer my question, Mr. Smith?

Mr. Smith replied that as a public company they did not wish to beat about the bush, but the only exceptions made were three public or corporate bodies in the town, and Mr. Hill was correct in stating that the discount was allowed to the dock company, but no private individual was allowed the reduction.

Mr. *Hill:* Part of these premises with which I am charged previously had the advantage of the discount, and when I became the tenant I claimed the same privilege, and they refuse it. It is not the discount that I care about, but there are other matters which I wish to be gone into.

After a short discussion, Mr. Smith called

Mr. *Ure*, one of the collectors, who deposed that he had from time to time applied at Mr. Hill's Saccharum Works for payment of the sums due for gas, and the amounts as rendered were never disputed. At the present time £145 2s. was due. That amount had not been disputed, but questions had arisen as to discount. For the Lady-day quarter he received a cheque in Mr. Hill's name, witness being told by a clerk that the matter, he believed, had been arranged, the company having agreed to make the discount. For the Michaelmas quarter he received a cheque for the full amount owing, less the discount.

Mr. *Hill* then contended that before the company could say any amount was due they must show that they had conformed to the conditions imposed upon them by Act of Parliament—they must prove that it was up to the proper standard of quality.

Mr. Smith replied that he was prepared to prove this most strongly and completely. It was rather a remarkable fact that in May, 1869, Mr. Hill from that bench made remarks reflecting upon the company with regard to the illuminating power of the gas supplied by them, only a short time after the question of discount had been raised in April. This having been in his (Mr. Smith's) recollection, he came there prepared to prove the point.

The Clerk suggested that if evidence upon this point would settle the matter, the bench possibly would have no objection to go into it.

Major-General Tryon: I want to know the connexion between the illuminating power of the gas and the discount asked for upon the account.

Mr. *Hill:* There is no connexion at all, but I think they must show that they have conformed to the Act of Parliament.

Mr. Smith said the Act provided that the question of amount, and not that of quality, could be decided by the bench. If a consumer was dissatisfied with the quality, all he had to do was to turn the gas off at the meter, and not burn any more. As, however, the question had been raised, he might say that the company had at a very great expense prepared at their works one of the most complete laboratories, fitted with delicate scientific apparatus, for testing the power and purity of the gas. They had asked the Town Council to appoint a properly qualified person to test the quality, and report to the public from time to time; but although the council has discussed the question, no action had been taken upon it.

Dr. Hearne: Do I understand there are other points in dispute as well?

Mr. *Hill* said yes; beyond the illuminating power, it was something which concerned the health of the town.

Mr. Smith quoted from the Act to show that the company had complied with its provisions in erecting apparatus for testing the gas.

The Clerk: I must ask you, Mr. Hill, formally, whether you dispute the account or not?

Mr. *Hill:* But the case is not complete.

The Clerk: If you dispute it, the whole question will be raised.

Mr. *Hill:* I say they have not made out their case.

The Clerk: But they have no case to make out if you do not dispute it.

Mr. *Hill:* Well, if the bench will not go on till I give an answer, I must say I dispute it on several grounds; the quality is one of them.

Major-General Tryon: That is a question we cannot go into or decide.

Mr. *Hill:* The discount is another; they allow it to others.

Major-General Tryon said that that, too, was a question upon which they could not adjudicate.

After some further discussion upon the quality, Mr. *Hill* contended that the gas there was 2-candle power less than that supplied in London; but Mr. Smith, on the other hand, said it was as much more, the Southampton Company supplying 14, and the London only 12.

Mr. *Hill* thought comparison should be made with other places; for instance, at Plymouth, the rival port of Southampton, the charge was 2s. 9d. per 1000 feet, against 4s. at the latter place, and yet this company said they could not afford 2½ per cent. discount.

Mr. Smith: What do they do at Winchester?

Mr. *Hill* said he found the gas there much superior to Southampton, as regarded the quantity of ammonia in it, but he did not recollect the price.

On Mr. *Hill* again stating, in reply to Mr. Eldridge, that he disputed the amount,

Mr. Smith contended that it could not be a *bonâ fide* dispute, and of this the bench should be satisfied before proceeding.

Mr. *Hill* replied that if the company sent out bad gas there was no penalty, and he urged that the public ought not to pay till they obtained better gas.

After some further argument, the Bench decided, for the satisfaction of the parties (though it was not to be taken as a precedent) to hear evidence as to quality, and

Mr. Smith called *James Jenkins*, assistant manager at the gas-works, who said his principal duty was attending to the illuminating power of the gas in the laboratory and testing-room, which was fitted up in accordance with the Act of 1865. There was there erected all the most modern scientific apparatus for testing the gas, so that any scientific gentleman could come there after proper notice. During the last twelve months the gas had been 14½-candle power, at least—rather over the standard required by the Act. The average for the half year ending December was 14·52. With regard to the purity, he could say no gas went from the works containing sulphuretted hydrogen, and it was, in other respects, according to the Act as far as practicable.

By Mr. *Hill:* The room was black—all black. The candles were weighed by scale, and were lighted before experimenting. The time they were lighted before weighing depended upon the candle; sometimes they were ten minutes, at other times not so long. They were supplied by Mr. Sugg, of London, who supplied the chemical apparatus. The experiment lasted ten minutes, and witness sometimes burned at the rate of 120 grains per hour. Always burned two candles; the discs were moved, but the lights were stationary. Had one clock, which struck every minute. Took ten observations in ten minutes; the meter was a dry one, tested by the Corporation of London. Any slight differences were easily perceptible on the disc. Every precaution was taken to exclude light. Examined the gas sometimes ten times a day. It passed the meter at a pressure of 3/10ths, but at the main there was perhaps 15/10ths. Would not say what quantity of ammonia there was, but it was very small, less than 5 grains in 100 feet. The gas was 20 per cent. better than the London gas.

Mr. Smith: We have not been fined.

Mr. *Hill:* But you have had no one to look after you.

Witness: Tested the gas yesterday. Would not say there was no ammonia in it. Five grains in 100 cubic feet were allowed to pass in London. The average quantity of sulphur during the past six months was about 23 grains per 100 feet. In London it was sometimes as high as 30. Since May, when Mr. Hill complained from the bench, they had not made the least alteration in the gas. There was not the slightest trace of sulphuretted hydrogen.

By Mr. Smith: Was in a position to state that the gas here, in illuminating power and purity, was superior to that supplied by the London companies. Knew this from the published official reports of the London inspectors to the corporation.

Mr. Smith wished to show the bench that the company had challenged the appointment of a properly qualified gentleman to analyze the gas.

Mr. *Hill* proposed to call Mr. Waite, a chemist, who, he said, was a competent witness upon any matters relating to gas, but General Tryon thought there was no necessity for hearing him; Dr. Hearne, on the other hand, being of opinion that, having heard evidence on this point on the part of the company, they should also hear any offered on the other side.

At length Mr. *Hill* said he would leave the matter in the hands of the bench, and

The Chairman said all they had to do was to make an order upon Mr. Hill for the full amount claimed.

Mr. Smith: We make no claim for costs.

Mr. *Hill:* But who pays the half crown? The company employ the police to collect their accounts, and I want to know if they pay anything for it.

Mr. Smith said they paid in the shape of enormous rates and taxes to the town.

Mr. *Hill*: But I pay large rates, and do not get it done. I will just state in the ear of Mr. Smith that last week the illuminating power in London was 17·1 candles.

Mr. Smith replied that this was an exceptional case, it being that of a company who had lately obtained a new Act.

The case, which excited some interest, then ended.

BELFAST POLICE COURT.—Wednesday, Feb. 2.

(*Before* J. C. O'Donnell, *Esq., R.M.; Dr.* Browne, *R.N., Mayor; and* John Preston, *Esq., J.P.*)

PROSECUTION BY THE BELFAST GAS COMPANY.

John Logan, oyster-house keeper, 33, Green Street, was summoned, at the instance of the Belfast Gaslight Company, for having, on Monday, the 17th of January, or some time previous thereto, laid, or caused to be laid, a pipe communicating with the pipe belonging to complainants, without their knowledge or consent. He was also summoned for stealing gas.

Mr. Seeds prosecuted, and stated that he would withdraw the prosecution for larceny, and proceed on the first summons, which gave his worship power to impose a penalty of £5. The defendant, when called, did not appear, and one of the summons-servers stated that he served him personally.

Robert Davis, examined by Mr. Seeds, stated that he was in the employment of the Belfast Gas Company. He knew the premises, 33, Green Street, kept by John Logan, the defendant. In consequence of information which he received, he visited the house on Monday, the 17th of January, at one o'clock in the day He found the gas burning, but it was not passing through the meter. The

connecting-pipe of the meter was removed, and an india-rubber pipe was put on, splicing the gas-pipe leading from the street with the piping near the meter.

Mr. O'DONNELL: Then by this means he could burn as much gas as he liked, and the company would have no means of checking it?

Witness: Just so. It was not passing through the meter. I asked the defendant how long he had been trying this on, and, after some hesitation, he said a week.

William Lynas, inspector in the employment of the company, said he went to the house on Thursday, the 20th, and found that the india-rubber tubing had been removed, and the piping again connected with the meter. The gas was passing through the meter all right. It had been put right by the defendant, and not by the company.

Mr. SEEDS: He is liable for a penalty for that also. He should not have touched it.

Mr. O'DONNELL said it was a very gross case on the part of the defendant, and inflicted the full penalty of £5.

DUNDEE NEW GAS ARBITRATION.

(*Before* HENRY HAWKINS, *Esq., Q.C., and* THOMAS HAWKSLEY, *Esq., C.E., Arbitrators; and* G. POWNALL, *Esq., Umpire.*)

WESTMINSTER PALACE HOTEL, TUESDAY, NOV. 2, 1869.

Mr. DAVISON, Q.C., and Mr. A. SHIELL appeared as counsel for the Dundee New Gaslight Company; Mr. J. Shiell as agent in Dundee, and Messrs. Grahames and Wardlaw as agents in London. Mr. LLOYD, Mr. PHILBRICK, and Mr. MICHAEL, appeared as counsel for the Dundee Gas Commissioners; Mr. W. Robertson as agent in London, Mr. Thomas Thornton as agent in Dundee.

Mr. CONNELL (clerk of the arbitration) read a minute, in which it was agreed that the inspection of the works of the company already made by the overman should be held sufficient for himself and the arbitrators, and that no fresh inspection be made.

Mr. HAWKINS suggested that the time should be enlarged for making the award, to the 1st of January, 1870. If they sat continuously till the limited time (the 9th of November), it was utterly hopeless to expect they could make their award before that day.

After some conversation, Mr. Hawkins's suggestion was ultimately agreed to.

Mr. DAVISON then proceeded to address the arbitrators on behalf of the Dundee New Gaslight Company. He said it was incorporated in 1846. Their capital, under the 5th clause in the Act, was £40,000, in £5 shares, with borrowing powers to the extent of £12,000. Unlike the old company, the new company's dividends were limited to 10 per cent., with a surplus to go to a contingent-fund up to £6000, for the purpose of answering any deficiency which might at any time happen in the divisible profits, to meet any extraordinary claim or demand which might arise, or to improve or extend their works. There was another provision in their Act which was rather unusual, the effect of which was, that as soon as there was a contingent-fund amounting to £3000, that instead of heaping it up and carrying interest to it, the interest was to be applied to the purposes of the general undertaking; to come in, in fact, as part of the 10 per cent. Clause 57 enacted that it should be lawful for the magistrates and Town Council to lease or purchase the works of the company, and, failing agreement, upon conditions prescribed in the Lands Clauses Consolidation (Scotland) Act. Clause 58 prohibited amalgamation without the authority of Parliament, or doing anything whereby the beneficial operation of competition might be impeded. The company first declared a dividend (2½ per cent.) in 1850. It was 5 per cent. in 1867, and last year 7 per cent. For two or three years up to 1864 they were much in want of gasholders. Before that year there was storeage for 120,000 feet only, the daily consumption being between 300,000 and 400,000 feet. The obvious consequence of that was, that they were making less gas and using more coal and labour than they otherwise would have done; and in 1864-5 they came to Parliament for a bill, under which they proposed to raise an additional capital of £15,000 to meet that difficulty. There was a petition from the Town Council, and there were some negotiations in which the company offered to bind themselves not to raise more than £6000; nevertheless the opposition could not be got rid of, and the bill was withdrawn. But so great was the necessity for further storeage, that the directors called together the shareholders, obtained their authority to raise a sum of £5000, and in 1867 the new gasholder was completed. In 1855 an arrangement was come to between the two companies, which was practically for their mutual benefit—viz., the utilizing the mains of both in Dundee. That work was carried on up to 1867, when it was proposed to come to Parliament for amalgamation, and a bill was introduced for that purpose, and the new company had at the same time a money bill. Now the same observation would arise now, as in the last case, upon that amalgamation bill. There were figures put in the bill, the object not being to show the actual value of the concerns, but the relative values of each. The figure in the bill for the new company was £40,000. Under the Act of 1846 no illuminating power was defined, the only check being the old company. In fact, the price was 5s. 6d., and at the commencement it was 4s. 6d. In 1851 it was 6s.; from 1852 to 1855 inclusive it was 5s. 6d., and it ranged with the other company's prices. On the 8th of March, 1867, the money bill took power to raise £15,000 additional share capital, and £3750 borrowing powers, with what as a rule had been 7 per cent. only upon the new capital, and the illuminating power clause stood then at 14 candles. There was a petition which was withdrawn, and also an agreement, under which they were now sitting, dated March 8, 1867. The money bill passed the House of Commons in April, 1867, with the alteration that the gas was raised from 14 candles to a minimum of 18. The bill then went up to the other House, and was again opposed by the Town Council. Then the letter of June 11, 1867, was written, which said in effect—"You shall not by these clauses, with the modification of Hume's clause, have an alteration of price. You shall take no advantage or disadvantage from that, but you shall be as if you had your bill in the state in which it was on the 8th of March." The bill received the Royal Assent, and the whole of the money was raised under it. The Town Council then prepared their purchase bill, and an agreement, scheduled to their Act, settled the date of entry as the 11th of November, 1868. In reference to the value, he (the learned counsel) proposed to rely mainly upon the last year of the make, and did so for the reason that it was only in 1867 the company got that additional storeage power, with the want of which they were so very much pressed, and were working under such very great disadvantage; and for that reason it would not be fair to take an average of years as against them. Another matter he would mention, or it might come upon them somewhat by surprise. The old company were not in the habit of taking the meter-rents up to the last year and carrying them to credit, and the new company were of course pressed for money to carry on these proceedings, and therefore took from their meter-rents a sum of £6269 4s. 7d., and placed it to their own credit to use as they liked. The commissioners would have to find that money, and in fact it was a debt upon the concern, upon which the company were not allowed a per centage to that extent; and the annuity to be granted to the shareholders would be reduced by the amount of interest which the arbiters thought it ought to bear. The learned counsel concluded by remarking that he was so much impressed (at any rate whatever the overman might determine) by the valuable information he had got as regarded the first six months working of the commissioners, that he had had the books analyzed up to a week or so ago, and the arbiters would not be surprised to find that since he got the first six months of their management, they were now using the very best coal, but they were also supplying gas of the very highest quality, and they had reduced their price. Therefore the figures for the last five and a half months would not be like those of the last six months, when they were making, in the way the company made it, good fair gas which satisfied the people, and were charging 5s. 4d. He would begin, as in the last case, by getting a rectified balance-sheet, and by going into the books.

Mr. *J. W. Guild*, examined by Mr. DAVISON.

I am an accountant, and member of the Institute of Accountants and of Actuaries of London. At the request of the directors of the Dundee New Gaslight Company, I made an examination of their books from 1846 to the last balance, which was on the 30th of April, 1868. They were very well kept. From 1850 the balance was annually struck on the 30th of April. In May, 1853, the whole of the capital (£40,000) except £415 had been issued, and it has all been issued since. In 1867 they got power to create £15,000 additional capital, and to borrow £3750 more. In the last balance, on the 30th of April, 1868, of their new share capital, £11,598 16s. had been issued, and since then the balance of £3401 4s. has been issued, making up the £15,000. On the same date there was £14,671 0s. 10d. of mortgage debt. Under Schedule B of the Act of 1857 the commissioners are to assume £11,850 of mortgage debt.

Mr. HAWKSLEY: Then we are to understand that what might otherwise be the award is to be diminished by £11,850?

Witness: Whatever is the annuity found without that must be diminished by the interest upon it.

By Mr. DAVISON: There is in addition to that a sum of £6269 4s. 7d. due to the bank.

By Mr. POWNALL: That is a liability to be assumed by the commissioners.

By Mr. DAVISON: That makes a total sum of £18,119 4s. 7d. [Statement here handed in.] On the 17th of May, 1849, there was an expenditure of £43,412 0s. 10d. In the report of 1849 to the shareholders a classified abstract up to that date was given amounting to this sum, and therefore year after year the amount expended in the year was added to the previous balance in the report issued. I have made an analysis of this account down to April, 1868, showing preliminary expenses, £4778 8s. 1d.; parliamentary and law expenses, £6953 1s. 3d.; excavation, £1420 17s. 7d.; masonry, tanks, walls, and buildings, £10,774 14s. 7d.; gasholders, purifiers, exhausters, naphtha and ammonia apparatus, £11,869 4s. 4d.; plumber, wright, and slater work, &c., £1611 16s. 3d.; iron roof for buildings, £1358 15s. 1d.; pipes, service-pipes, and pipe-laying, £22,130 3s. 6d.—making up the £12,300 3s. 11d., the £3072 5s. 1d., and the £6757 14s. 6d. Meters, £12,891 7s. 2d. Feu duty (for a small property redeemed), £220, and solum of the ground £72 9s. 9d. The total of these items is £74,080 17s. 7d.

By Mr. HAWKSLEY: I cannot tell if the cost of meters includes the whole of the fixing. It does to a certain extent.

By Mr. DAVISON: The amount for ground sold to the Dundee and Arbroath Railway Company, and interest, is £1064 1s. 9d.; reserve-fund, £4608 2s. 6d. The undivided profits up to the 30th of April, 1868, are £2097 14s. 1d., and the balance of meter-rents to the same date is £2510 7s. 7d. The two together are carried to the credit of the "Formation of works" account in one item—viz., £4608 2s. 6d.—under the title of "Reserve-fund."

By Mr. HAWKSLEY: I understand it to be a voluntary reserve that the company can resume at any moment. It is not the reserve-fund contemplated by the Act.

By Mr. DAVISON: The "Undivided profits" are £2628 3s. 5s. That is the same class of items after 1856 as formed part of the £4000 before 1856. The item for meter-rents from 1856 to 1868 is £2628 7s., making a total of £10,928 14s. 8d., and that deducted from the £74,080 17s. 7d. leaves a balance to the debit of "Formation account" of £63,152 2s. 11d. After the balance of the 30th of April, 1868, entries to the amount of £6269 4s. 7s. were made in the books, correcting the credit of those balances of meter-rents by debiting the "Formation of works account," and crediting the revenue with that sum, making the balance of "Formation account" £69,421 7s. 6d. The meter-rents were carried to the credit of the account to the extent of £8314 3s. 7d. The repairs during the period are £2044 19s., and "Making and reconstructing, £1130 10s. —together, £3175 19s. That is to be deducted from the £8314 3s. 7d. leaving a balance of £5138 14s. 7d. The actual value of meters in the "Formation of works" account at the 30th of April, 1868, was £7752 12s. 7s.

By Mr. HAWKSLEY: I mean the value in the company's books.

By Mr. DAVISON: There is to add to the £7752 12s. 7d. the £5138, and £1130 2s. for reconstructed meters, amounting to £12,020 14s 7d., making the present value in that way £14,021 17s. 2d. For the year ending April, 1868, the meter-rents amounted to £600 5s. 8d., from which £75 16s. 6d. for repairs must be deducted, leaving £524 9s. 2d. net. That was the only year meter-rents were carried direct to revenue. The reason I add £4725 18s. 4d. to the £69,421 7s. 6d., the balance of "Formation of works" account, is because there was that sum written off from profits during the period of the company's existence. In the "Formation of works" account the £4608 2s. 6d. included £2097 14s. 11d. for deterioration. You will find "Undivided profits" £2628 3s. 5d. after 1856. The two sums together are £4725 18s. 4d., both of which had been credited to that account. I have examined the details of the outlay on piping—services, £821 5s. 1d.; mains, £256 6s. 2d.; pipe-laying, £924 8s. 9d.: total, £2011. Adding this to the capital account, it is £76,158 5s. 10d., to which I add £215 0s. 10d. expenses of the money bill of 1865, making gross expenditure on capital account £76,373 6s. 8d. I think the last item a fair charge on the revenue. I have here the abstract of revenue and expenditure account. The total revenue from gas is £152,307 8s. 1d.; secondary products, £19,727 10s. 7d.; which, with the meter-rents, make a total of £172,559 7s. 10d. The expenditure for coal during the same period was £74,998 13s. 1d.; lime, £2991 4s. 4d.; interest, £12,241 11s. 7d.; wages, £18,156 12s. 7½d.; retorts and settings, £592 5s. 10d.; rents and feu duties, £4703 11s. 4d.; general expenses, £5347 13s. 2d.; salaries, £6667 5s.; taxes and fire insurance, £1544 17s. 3d.; the town of Dundee, £950; that makes £5263 added to the rents and feu duties. In all it is £135,551 1s. 8½d. That gives a surplus revenue of £37,008 6s. 1½d. net from 1847 to 1868. [Statement handed in.] I have also prepared a table showing the dividends declared. In 1847 it was 2½ per cent. Then there was nothing for two years. In 1850 it was 2½; in 1851, 4 per cent.; then for three years, 3; in 1855, 2½; 1856, 4; 1857, 5; 1858 and 1859, 4½; 1860, 5; 1861, 4½; 1862, 3; 1863, 4; 1864 and 1865, 5; 1866, 4½; 1867, 5; and in 1868, 7 per cent. Total amount of dividends paid, £31,943 2s. 3d., leaving profits undivided, £5065 3s. 10d. I have made out a "Rectified profit and loss account." [Handed in.] The meter-rents were not taken into revenue till last year. After making all deductions, this is £6269 4s. 7d. to add for meter-rents and construction, stamping, &c., and there is also the £2011 to add, which is charged against revenue for service-pipes, and the items I have explained, and that is £8280 4s. 7d., giving a net revenue of £45,288 10s. 8½d., instead of the £37,008 6s. 0½d. Deducting the £31,943 2s. 3d., the amount which has gone in dividends from the £45,288, it leaves an undivided profit credited to the capital account of £13,345 8s. 5½d. To that must be added the profit for 1868—viz., £3107 13s. 2d., making in all £16,453 1s. 7½d., and if the surplus profit for 1868 (£124 4s. 8d.) is deducted from that, it will bring out the £16,328 16s. 11d. appearing as the total balance of the revenue account undivided at the 30th of August. All I can find as cost of drainage since the company began is £917 12s. In 1848 the quantity of gas made was, in round numbers, 15 million cubic feet. In 1858 it reached 36 millions, and in 1868, 63 millions. The net revenue from gas and secondary products in 1868 is nearly quadruple that of 1848. The increase of 1868 over 1862 is 2·50 per cent.

By Mr. HAWKSLEY: The increase of 1863 over 1862 was 6·8; of 1864 over 1863, 11·3; of 1865 over 1864, 12·3; of 1866 over 1865, 10·4; of 1867 over 1866, 7·4; of 1868 over 1867, 5·4. The average of these figures is 8·9.

By Mr. DAVISON: I should think that is the natural increase of consumption of gas; there appears to me to be nothing speculative. I understand the population of Dundee has doubled within the last 30 years. The average cost of gas-

making from 1860 to 1868 was 2s. 7d. per 1000. The price charged for gas, and previously to the time of the works being handed over, was 5s. 4d. per 1000 feet. The average loss by leakage and condensation for the last six years is 23 per cent. The net revenue realized by the company is exactly 3s. 9d. per 1000 feet. Taking 2s. 7d. per 1000 from the 3s. 9d., I have 1s. 2d. profit for every 1000 cubic feet. The feu duties, £1122 13s. 2d., makes nearly 4d. per 1000. It includes salaries, direction, general expenses, stationery, rent and feu duties and taxes, and fire insurance. The average loss over the nine years will be about 22·4. The salaries would not progress in the same ratio as the increase of manufacture. Rents and feu duties are fixed as long as the capacity is not gone beyond. Taxes would increase if the rateable value was increased. The rental and fire insurance are only £285 out of the £1122. I think that 2d. is quite sufficient to take off for future increase, with the view of looking to see what the present capacity is. That leaves 1s. net upon the make, to be taken, of course, by the capacity. I have been told by all the gentlemen practically connected with gas-making that 23 per cent. is excessive leakage, and we cannot understand how it can have arisen.

By Mr. HAWKINS: Assuming that the works will produce 100 million feet, it will take about five years, at that rate of increase, to utilize the whole power of the works.

By Mr. DAVISON: That is at the same rate that we have been going on at upon the average of these nine years. The directors report for the year ending April, 1868, shows a balance of £3107 13s. 2d., and, dealing with that as it ought to be dealt with, it comes out at £3544 1s. 1d., being a difference of £436 8s. 8d. I account for that by reducing the interest by £310 6s. 9d. Then there is an amount for directors which should come out, viz., £57, and £69 1s. 11d. for service-pipes, charged against revenue, which should be charged against capital, making up the total of £436 8s. 8d. The interest charged in the commissioners account is £1035 2s. 2d. I have examined the books of the commissioners. They show the quantity of gas made, the coals consumed, and the general expenditure up to Oct. 26. In the document they put forth, they estimated the make of gas from the 30th of April to the 11th of October, at 82,087,000 feet, and the coals at 7630 tons, representing 10,758 feet of gas per ton. From Nov. 11, when they entered, till April 30, 1869, I find the average illuminating power was 26·8; 56,981,700 feet of gas were made. The quantity sold was not made up, but I presume will be on the 11th of November. There are 18 days to add to it, in order to arrive at the make for the six months, to complete the year, and, as the days at this time get very short, I take the make for these 18 days at 1,100,000 feet per day. That gives 18,900,000 feet for the 18 days, and a total of 76,781,700 feet for the period, or 5,218,300 less than the estimate made on the 30th of April of 82 million. The quantity of gas got from the coal between April 30 and Oct. 25 was 11,355 feet per ton, being 597 feet per ton more than the estimate of 10,758 feet. The coals consumed would only be 7228 tons, instead of 7630 tons as estimated. That is accounted for by their using more coals of a higher class from April to October than in the previous period of their operation. The cost per ton was 20s. 10½d., and that arose in a large diminution in the delivery of the low-priced coals. The average illuminating power from April to October was 29·7. It was sometimes more than 30—it was 31 several times during that period. Contrasting what the result would be on the estimate, and what it is upon the actual workings, I arrive at it as follows:—The estimate was a cost of £7122 for coal yielding per ton in gas 10,758 cubic feet, with an illuminating power of 26·8. I find the actual result up to Oct. 25 to be, that the coal will cost, taking it up to the same period, £7551. The yield per ton is 11,355 feet, with an illuminating power of 29·7. Working these figures out, the cost of coal estimated, as contrasted with the production per ton and the illuminating power, is ·247; the actual result is ·233. The actual cost of working to produce the same quantity and quality of gas has been less, during the period from April 30 to Oct. 25, than the estimate upon which the results here were based. The product is fully 10 per cent. greater as tested by the cost of coal. They have reduced the price of gas from 5s. 4d. to 5s. It seems clear that from the 30th of April the result of the working of the commissioners has been more favourable than was anticipated. I have no doubt that the balance at the end of November will more than support the estimate of £20,188 18s. 5d., as net surplus revenue for the whole working of the year; of course excluding all questions of interest, dividend, and annuities. That is the surplus of the two undertakings. I cannot separate the old company from the new in the operations.

By Mr. HAWKINS: In the case of the old company I estimated that if £20,000 were earned, £14,000 belonged to the old company and £6000 to the new. I have no other data at present.

By Mr. DAVISON: The prices for residual products last year were high, and largely in excess of those the company had got for some years. The increase is something like 33 per cent. Up to the 30th of September the total cash operations of the commissioners amounted to £148,399 16s. 9d. That statement includes their whole payments, excluding their bank operations, profit account, deposit account with the bank, expenditure on the Dundee Gas Act, and the present arbitration, which does not properly belong to the working of the company. The receipts show the whole sums received by the company, excluding bank account and mortgages, and amount to £37,217 0s. 6d. The receipts on the other hand, excluding similar items, are £33,884 3s. 1d. Then there were operations of receipts on account of bank and deposits, and the expense of the arbitration, £111,109 17s. 5d. The result of these figures is £3332 17s. 5d. excess of receipts over payments on what I consider the revenue or working account. For a time the receipts exceeded the payments. At the end of March, the commissioners, from an excess of gas and other revenues, were in funds over the total expenditure to the amount of £3311 14s. 9d. At the end of April that amount had increased to a balance in hand of £7372 4s. 2d. Allowing them 2 per cent. on their balance when they are in funds, and charging them 5 per cent. when they have overdrawn, there is a debtor balance of only £55.

By Mr. HAWKINS: The result is that there is no capital at all. I cannot ascertain the outstanding debts on the 30th of September, but taking as my basis the balance due on the 30th of April, 1869, of £7052, and estimating the total gas made, *minus* 25 per cent., at 5s. per 1000 feet, and adding those two sums together and what I estimate will be the production of the secondary products, I get a total gas charge of £16,034. The whole receipts of the commissioners are £9569. Upon these data there was outstanding, on the 30th of September, £6374, or £3000 more than the debtor balance, and it is at a period of the year when it will be rapidly increasing—during October and November. The debts due to the company will rectify themselves immediately the large collections take place in January and February.

By Mr. HAWKSLEY: In October the commisioners paid, in anticipation of the make, £1027 for coals. In November they paid £128 in excess. In December they paid £1253.

By Mr. DAVISON: In March they received £4700, whereas they only paid £2800, and the next month they received £8800, and only paid £4800. Then, in the next month, when the annuities fell due, they received £3000, and paid £11,000. It goes on fluctuating, and the only way to test the cost is to take the interest over the period. I have dealt with the worst time the company could have. The commissioners only began operations on the 11th of November, but they paid out considerable sums in advance in October, which were unnecessary. I have included the whole sum paid for the old and new companies stores, which the commissioners were bound to take over by Act of Parliament.

By Mr. HAWKSLEY: The result of my view is, allowing interest at 2 per cent., and charging interest at 5 per cent., the balance of the account would be *nil*.

By Mr. DAVISON: I have had a good deal to do with the value of securities. I class gas and water property on a level with first-class house property. I consider that the holder of a heritable bond is in a much better position than the holder of an annuity; there is no combined action rendered necessary in the event of the bond not being paid, and he can realize the worth of his security without diminution, although the money market at the time may be very much against him. It is quite different in the case of either a gas or a water annuity. You may be driven at a very unfavourable time to realize, and I think that, taking all the contingencies which may result to the holders of gas or water annuities in realizing their property, 4½ per cent. is a fair and moderate rate to take. I was engaged in the Glasgow gas and Dundee water cases. Money is still very cheap and abundant. Good security is very difficult to get. You can buy Edinburgh water now to yield an annuity of £4 17s. 6d.; Dundee water, £4 6s. 8d.; and Glasgow water, £4 3s.; but in the latter case there is a reserve-fund which I think is still divisible in addition. [A table was here handed in, showing the dividends of the Dundee Water-Works.]

Mr. HAWKINS suggested that the evidence on this point, as given in the old company's case, should be taken as evidence now.

Mr. DAVISON and Mr. LLOYD both acquiesced.

SECOND DAY.—WEDNESDAY, NOV. 3.

Mr. *J. W. Guild* recalled, and cross-examined by Mr. LLOYD.

The item for reconstruction of meters (£1130 10s.) is an estimate made up at the time the work was executed, and is arrived at by taking the number reconstructed and stamped, in terms of the Act, between 1862 and 1868, at 10s. per meter. None of the £3944, for "Miscellaneous expenses and engineering," went actually to formation of works. I do not think it included masons work or ironwork, but rather all those innumerable details which must be incurred in the formation of a gas company. The same applies to the second item of £638. In the "Rectified revenue account" the difference of £436 8s. 8d. between the company's statement and my rectification is made up as follows:—The difference between the interest debited in the accounts for that year, amounting to £1035 2s. 2d., and the proper interest, £724 15s. 5d.—viz., £310 6s. 9d. The remainder is made up of £57, taken out of the general expenses for directors fees, and the charge for service-pipes, £69 1s. 11d., which I take off. I reduce the pipe repairs from £109 0s. 2d. to £39 18s. 3d. In the year ending 1867, £1020 2s. was paid for interest, and the year ending 1868, £724. The additional capital has been raised in the interim. The latter is not a debt handed over by the company to the commissioners; it is shares upon which dividends or annuities are to be paid, and it does not affect any question of what is the free revenue, the sum which should be fixed as the present value of the concern. If further capital is raised it necessarily comes in for dividend. The old company had no debt handed over to the commissioners.

By Mr. HAWKSLEY: In this case it is subject to £18,000 debt, and I have deducted the interest on that amount.

Cross-examination resumed: I think the rate was in excess of that charged against revenue in the previous year of 4 per cent. The money was to a certain extent governed by a bank rate. The commissioners can borrow at that rate. In the "Rectified revenue account" I have taken credit for so much as is due to revenue which had been improperly charged against it, and I place it now to capital, and credit the revenue account with the difference. I do not know whether all the meters, upon which £14,021 17s. 2d. has been expended, are in existence or not. I have no doubt some of them must be worn out by this time. The total number of meters is about 9118, of which 4313 have been reconstructed, under the Sales of Gas Act, since April, 1862. Of the 4113, only 2261 had been reconstructed and charged to revenue prior to April 30, 1868. That, at 10s., makes £1130. The rate of increase of consumption is certainly lower in 1868 than in the previous five years. Fluctuations may be accounted for by the state of trade, &c., but the progress of the company has been throughout, I think, very satisfactory. The balance of uncollected debt was at April 30, 1868, £3095 15s. 1d., being in excess of any previous year. The total amount actually written off for bad debts to April, 1868, since the works have been in operation, is £4112 6s. 5d., and the total charge for gas in the same period is £161,436 9s. 11d. That is, as near as possible, 2½ per cent., but includes bad debts for meter-rents also. The meter-rents were £8914 9s. 3d. during the same period. On the whole, it was a little more than 2½ per cent. I have charged, for last year's bad debts, about three-quarters per cent. upon gas and meters. The amount now uncollected is £898 13s. 11d. Legal expenses are inevitable for the recovery of bad debts. I have gone into the item of £6269 4s. 7d., which is stated to be a debt due to the bank.

Mr. HAWKSLEY: Do the commissioners take over any of the common contract debts, or only the secured debts?

Witness: Nothing except the mortgage debts and this £6269.

Mr. LLOYD: It is stated by themselves, £11,850 mortgages and £6000 odd to the bank.

Cross-examination resumed: That debt was contracted originally on the 21st of August, 1868. It is a sum drawn out upon an adjustment of the meter-rent account. When I went to Dundee in July, 1868, and had brought with me the position of the meter account, it was explained that meter-rents to the amount of £6269, which ought properly to have been taken to revenue, had been carried to the diminution of capital expenditure. That was in their view an error, as not being consistent with the usual practice of gas companies. I suggested that the way to rectify that account was at once to transfer from capital debtor the £6269 to revenue credit, and the company not being then possessed of funds, the natural operation was in adjusting the capital and revenue account, to draw from the one account in the bank and pay into the other—a very common practice. The commissioners can sustain no loss whatever if they are allowed a reduction for the interest on that debt.

Re-examined by Mr. DAVISON: I should think the £880 outstanding for gas accounts arises to a very great extent from the commissioners having entered, and the power being lost to cut off the gas. The bad debts in that year were £16 below the previous year. A large number of meters have been bought since 1859. With regard to interest, I have allowed 4 per cent. on the money, and they had been paying something over that. In the balance-sheet ending the 30th of April, 1868, there was £11,598 16s. paid up to new ordinary capital, and the amount of interest and expense for the same period was £1035, to compare with £1020 of the previous year.

Mr. *John Dick*, examined by Mr. DAVISON.

I was secretary of the Dundee New Gas Company fourteen years, and had the management of their financial transactions. Previous to 1864 there was great difficulty with respect to the storeage power. It was very deficient, there being only storeage for 120,000 feet, with a daily consumption of between 300,000 and 400,000 feet. In 1864 we made up our minds to come to Parliament with a bill for power to raise a further sum of £15,000 share capital. There was unexpected opposition, and the bill was withdrawn. Afterwards there was a meeting of the shareholders, and the directors were authorized to borrow £5000 on the credit of the company. The construction of the tank and gasholder was commenced in that year, and completed in November, 1866. Mr. Macrae came about the 1st of January, 1867. Up to that time we had been making less gas than should have been made out of the quantity of the coal used. The daily consumption so far exceeding our gasholder power, we had to keep a great number of retorts heated up ready to light the moment darkness came on, and that was the cause of great loss. We were obliged to lighten the pressure in order to make the gas last out, and to send nearly the whole daily make of gas through the purifiers in a few hours, whereas if we had got plenty of gasholder power we could have spread it over the whole 24 hours. We had a very great loss in the quantity of lime used in the purification, owing to the same cause. It also ne-

cessitated the employment of a great many men there. When Mr. Macrae and the new gasholder came, things went on very much better. Mr. Macrae is a very good manager. He complained of the want of a governor, which was constructed in connexion with the gasholder. He also suggested other alterations, and he appeared to be satisfied. There would have been some extension necessary if the companies had continued to go on separately, but working together they got on without any complaint from him. In 1865-66 there were 60,711,700 feet of gas made, and in 1867-68 (after the increased storeage), 68,799,100. There were 6729 tons of coal used in 1865-66, as against 6409 in 1867-68. Average number of retorts, 32·24 in 1865-66; 27·31 in 1867-68. Firemen, 10·73 in 1865-66; 2·16 in 1867-68. Labourers, 12·96 in 1865-66; 8·29 in 1867-68. As to lime, it cost £289 to purify 60 million (in round numbers) of gas in 1865-66, although we purified 68 millions for £276 in 1867-68. Of coals there was a loss before the new gasometer of 1074 tons; retorts, 8·14; firemen, 2·65; labourers, 5·65; and lime, £49. The coals were 17s. per ton at the time, and that made £913; retorts (including setting), £6, £48 16s. 9d.; firemen, 25s. per week, £172 5s.; labourers, 15s. per week, £220; total loss in the year, £1403 8s. 9d. In addition to that there was a loss from not being able to supply sufficient gas to the consumers. I remember the amalgamation bill. My board never agreed to the proportion stated in the bill, with regard to the shares in the two companies, of five to one.

Cross-examined by Mr. LLOYD: It was put in as a merely nominal sum, to allow the bill to go on, and was to be adjusted hereafter; but the new company never agreed to this proportion. The intermediate year—1866-67—was dropped out, because in that year a new gasholder was constructed, and it did not show a clear year before and after its construction; and Mr. Macrae was only able to introduce his improvements in carbonizing coal, and so on, in the early part of 1867. I did not assist in the manufacture of gas. I take the results of working from the books. I have seen the directors reports which have been issued from 1855. I do not know if there are many streets in Dundee in which pipes are not laid. There are none laid in Lochiel. It is not a part of Dundee, but is within the district. In this book [handed to witness] there appears to be 6072 tons 19 cwts. of coals carbonized in 1865-66. My statement of 6729 is quite likely, but the coals were not weighed here. A certain weight was returned for each barrow, or whatever they put in the retort-house, but it was not correct. We arrived at the quantity of coals carbonized by taking the stock at the beginning of the year, the coals received during the year, and the stock at the end of the year. We did not weigh the stock, but cubed or measured it.

By Mr. SHIELL: That was quite sufficient for all practical purposes.

By Mr. LLOYD: We have from time to time lent gas to the other company We were not always short of the supply which the consumers would have taken and required. We were very glad to lend. Our gasholder would be filled perhaps by ten in the morning, and we were obliged to lay off during the day; but if the old company wanted gas, we would be glad to make it during the day until it came on at night. We could have supplied them from the retort power that we had with a greater quantity daily if they wanted it. Sometimes the old company lent us gas. I did not say the production was greater under Mr. Macrae's management than it had been at any previous time. I said for five or six years. It was not more in 1864-5 than it was in 1867-8. It was 9695 tons. In 1863 it was 10,315 tons, the year before that 10,691 tons, and the year before that 11,121 tons. I only compared 1865-6 with 1867-8. The yield was greater under Mr. Macrae's management than it had been for some years before at any rate. The price of coals was very much greater in that year.

Re-examined by Mr. A. SHIELL: To arrive at the quantity of coal consumed is quite an easy calculation.

By Mr. LLOYD: On the 30th of September, 1865, there were 8071 meters upon consumers premises; in 1866 there were 8265; in 1867, 8085; and in 1868, 7976.

Mr. HAWKSLEY: That differs largely from the number purchased, which was put at 9118.

Witness: There was a great number in stock at that time.

By Mr. LLOYD: The commissioners will have to pay for them.

Mr. *R. P. Spice*, examined by Mr. SHIELL.

I am a gas engineer in Westminster. I have carefully and thoroughly examined the works of the Dundee New Gas Company, and also the accounts of the company's working, from the commencement up to the end of the last financial year. My opinion is very favourable as to the plan of the works, and the state in which I found them. It is an exceedingly good modern gas-work.

Mr. POWNALL: Perhaps I may save Mr. Shiell some trouble by saying I have examined these works very carefully, and I have reported to the arbitrators my impression that they are good works, and in a good condition.

Mr. LLOYD: Exactly so, sir; only do not let us include the mains and pipes.

Mr. POWNALL: Those I did not see. I do not know how Mr. Shiell can hope to get a more favourable opinion of the works than Mr. Lloyd concedes.

Mr. LLOYD: There are two gasholders which do not come into the category of "good."

Examination resumed: There is no doubt that the company, up to a very recent date, were working under very adverse circumstances which were not overcome until the last financial year of their existence. The works had not been judiciously handled, and until their last year there had not been anything like such results as might have been produced in good hands. In making my valuation for sale or transfer, I have adopted the usual mode of valuing a commercial undertaking which is a going concern, taking the last year as the basis of my calculations, and taking into account such circumstances as affected the last year's results. I took Mr. Guild's rectified balance-sheet up to Nov. 11, 1868 (the company's financial year). I have prepared a printed statement.

The following statement was handed in:—

VALUATION OF UNDERTAKING.

Receipts.

Gas-rental		£13,531 12 11
Meter-rental		600 5 8
Coke		690 10 2
Naphtha		176 15 9
Tar		99 12 9
Sulphate		198 4 2
Waste lime		52 6 10
Total receipts		£15,349 8 3

Expenditure.

Coals	£7,168 19 7	
Lime	276 0 3	
Wages (general)	1,452 16 0	
Ditto, &c. (on products)	213 19 8	
General charges	149 14 7	
Retorts and apparatus	351 10 2	
Repairs of pipes	39 18 3	
Rents and feu duties	223 18 11	
Taxes and fire insurance	285 14 8	
Salaries	356 5 0	
Meter repairs	75 16 6	
Town of Dundee	50 0 0	
Discounts	337 3 7	
Bad debts	102 13 10	
Interest on loans to be borne and paid by commissioners	724 15 5	
		£11,809 6 5
Balance, being profit, exclusive of transfer fees		£3,540 1 10

Brought forward			£3,540 1 10
Add on account of exceptionally low value of secondary products this year			400 0 0
Add on account of exceptionally high price of coals in 1868 (2s. 6d. per ton—6409 tons)			801 2 6
Annual value of surplus land at the rates assigned to it by experts in Scotland			526 0 0
Surplus retorts and proportion of retort-house (18 at £50)	£900 0 0		
Surplus gas storeage (198,000 feet, at £22 per 1000 feet)	4,356 0 0		
Value in capital sum	£5,256 0 0		
Annual value at 5 per cent.		262 16 0	
		£5,530 0 4	
Less by further allowance on account of meter maintenance, making it up to 2½ per cent. on the value of those in use	£135 2 6		
Less also by further allowance on account of bad debts, making it up to 1½ per cent. on net gas and meter rental	104 4 8		
And less by an allowance of one-half per cent. on £50,000 for a reserve-fund for maintenance of works	250 0 0		
		489 7 2	
		£5,040 13 2	
Add for compulsory sale 10 per cent.		504 0 0	
		£5,544 13 2	

The above sum of £5569 16s. I consider to be the value of the property to be surrendered for perpetual annuities.

21, *Parliament Street, S.W.* R. P. SPICE.

Examination continued: The receipts altogether are £15,359 8s. 3d. to April 30, 1868. The amount is from Mr. Guild, and the balance which I have shown is the profit, exclusive of £4 for transfer fees. With that exception the balance is £3540 1s. 10d. I add £400 for low value of residual products it being about half between last year's value and this. I add, on account of the exceptionally high price of coals in 1868, 2s. 6d. a ton (about half the difference between this year and last). I ultimately add £801 2s. 6d. to the profits on that account.

By Mr. HAWKINS: I take that 2s. 6d. in perpetuity.

Examination resumed: I take credit for having land in front of the works next Dock Street, and the surplus of the retort power, the retort-house, and the surplus land on which the surplus gasholder stands, not the whole, but a portion of that gasholder. The annual value of those three plots is £526. I exclude the triangular piece. I make the commissioners a present of it. With regard to the other plots, I take the land (in front) at 60s. a pole, and 50s. the other. There are 18 surplus retorts at £50—total £900 (including a portion of the retort-house). Surplus gas-storeage, 198,000 feet, at £22 per 1000, £4356. I take that at three-fourths, which is the greatest make as sufficient for gasholder storeage. Those sums make £5256, which, at 5 per cent., is £262 16s.; bringing my value up to £5530 0s. 4d. From that I make these deductions. I see from Mr. Guild's account that the meter maintenance is £75 17s. 6d., and I put £135 2s. 6d., making it up to 2½ per cent. on the value of the meters in use on Nov. 11, 1868. I value those in use at £8375. Taking the meters at cost price, and allowing a rebate of 20 per cent. for depreciation, the gross value of the meters is £10,468 10s., from which I write off 10 per cent., and as the meters are manufactured and restored on the premises at a cheap rate, it would keep the stock alive; 8120 is the total number in use, and deducting that from the number the company have purchased—viz., 9118, it leaves 988. I have allowed £104 4s. 8d. for bad debts. I take off the discounts from the gas-rentals, and I take the meter-rental as it stands.

By Mr. HAWKINS: I have never allowed in any former case more than 1 per cent. for bad debts, and here I allow 1½. Bad management must have produced the 2½. There is no provision made in the last year's account for the permanent maintenance of the works, and therefore I allow £250 a year to be invested, and to accumulate at compound interest. Whether it is allowed or not, I claim 10 per cent. for compulsory sale, bringing up the total to £5544 13s. 2d.

By Mr. SHIELL: I have never known so large an allowance for bad debts before. In my estimate of the meters I have not taken into consideration those I found and valued in the stores.

By Mr. HAWKINS: At the last hour after I had made out my valuation some corrected statement was given as to the quantity of land in Dock Street, and that has diminished the quantity of land I had to deal with. It is only an addition of £25.

Cross-examined by Mr. LLOYD: It has been my practice to charge service-pipes upon the capital. I draw a line between new pipes and the repair of old ones; an old pipe replaced should be charged to revenue. I have added £400 to secondary products on account of the very low price of naphtha and ammonia in the year under consideration. Naphtha has increased from 1s. 3d. or 1s. 6d. a gallon up to about 4s.; sulphate of ammonia from £10 or £11 to £18 or £19 per ton. The chemical plant was not anything like so elaborate as the old company's works. I do not know that it was useless. I think I have heard that the secondary products were obtained from the use of the chemical apparatus of the old works. I do not know the prices of coals at the present time. The difference between the price then and now when I was in Dundee was 5s. a ton. The greater portion used is not Boghead cannel. I found a stock of cannel in the works which had not been touched for four or five years.

By Mr. HAWKINS: There were 300 or 400 tons. That was so much waste capital during that time. I have taken no account of that. I think that it will be an addition to profits.

By Mr. LLOYD: I think that [alluding to plan] surplus land could be used for extension of these works. I have reduced the land occupied by retorts 10s., not because it is so occupied, but because it is back land. The greatest number of retorts in use at one time is 54. I allow 60, and there are 78 altogether, giving me 18 surplus. There were 21 retorts in one stack, with 7 settings of 3 inches; there were 42 in a double stack, with 14 settings of 3 inches. Then in a single stack there were 15 retorts with 5 settings. Twenty-two retorts were new in a double stack. Twenty were of the average age of eight months, and the other 15 were quite new. The average age of those that had been in use was eight months; they were about one-third worn. The latter retorts are 7 feet long by 26 inches by 14. They are short by 1 foot. I was not aware that these retorts were practically superseded. I do not know that 15 per cent. for compulsory sale is very common. I am familiar with 10 per cent. I believe the two small gasholders are patched in places, but I think they would last a long time. Their incapability of being used at night is not a defect. They must be used for the day. My total storeage includes these gasholders. Bad service-pipes may exist in any town which has been lighted for 20 years. Those things are not seen in gas-works which are properly looked after. The mains were equal to what they were doing. If they had been larger, which I admit would be an improvement, they would then have earned a greater rental, and I should have been making a claim for surplus main power. I should have earned a larger rental at a less cost. I consider the works capable of extension on the site where they are. Extension would not necessarily imply reconstruction. I do not think I should have to destroy anything. I could extend the retort-house toward the gateway, and I should bring it on towards the front, and I could get any quantity of retort-power without taking down a retort-stack. I should not touch the condensers at all. I should let the apparatus be.

Re-examined by Mr. SHIELL: It would be a more economical arrangement for the commissioners to get the residual products manufactured at one place. I have no doubt the apparatus which I saw at Dundee would be quite capable of earning £2000 worth of secondary products. If the gasholder is well patched it is good. I have often had to give a greater price for land for a gasholder, than for land to build a good villa upon. By the Act of last year, the Dundee Harbour Company will have works opposite these, which must increase the value of the land. The company went on up to the date of transfer putting new retorts where they were required. The works, as a whole, are unequivocally in a good working order.

By Mr. HAWKINS: Coals being high or low in price, must necessarily affect the price of gas to some extent. I should certainly advise any owner of this undertaking to keep the surplus land, because money would not buy land near it. I think I estimated something like £40,000 for the land.

By Mr. HAWKSLEY: If the company wanted to buy land to enlarge their works, they would have to pay about £5 a pole. In 1853 the price of gas was 5s. 6d., and coal 15s. 4½ per ton. In 1854 gas was 5s. 6d., coal 23s. 4¾d. In 1862 gas was 5s. 6d. for the first half year, and 4s. 10d. the second half; coals were 18s. 6¾d. Between 1852 and 1862 gas was stationary, but coals varied from 15s. 4½d. to 23s. 10d. The consumption decidedly influences the price. I have no sum for dilapidations at all, and am not aware that they exist. My decided impression is, there is no money to be laid out to enable the commissioners to earn the profit I have assigned. I should think the old gasholders might continue to be useful for 20 years, if properly taken care of. The distillatory apparatus is in good condition, but not first-rate. It is sufficient in magnitude for the one undertaking. To make a modern concern of it might cost £300, and I think an allowance of that sum ought to be made.

THIRD DAY—FRIDAY, NOV. 5.

Charles Edward Cawley, Esq., M.P., examined by Mr. DAVISON.

Last January I examined the books of the Dundee New Gas Company, with a view to a valuation of the undertaking. I dealt with it as a valuation of a going concern—not as a question of structural value—basing it upon a fair and reasonable prospect of a return by the owners. For that purpose I started, as Mr. Spice has done, with a balance, in 1868, of £3544 per annum. The residual products were unusually low during that time, and there is every reason to believe they would average considerably more than we put upon them, and so for that I added £400, which does not bring the amount of 1868 to the average of the last six years, last year being so very low. With regard to coals, I assumed that on the quantity used the average price would be 2s. 6d. a ton less than for the last year given in their accounts, which makes about £900. That would make a total of £4744. On the other hand, there are two items on which they have not allowed so much as they ought, as, in arriving at the £3544 with regard to the meter-rents and bad debts, the amount of the average is not deducted. I then bring up the meter returns to 2½ per cent., as the value of those in use, and looking at the proportion, the value would be about £8400. There should be a deduction of £210, and there is an entry of only £75; therefore there is £135 more, under that head, to deduct. I think that, with good management, 1 per cent. upon the gross receipts would more than cover the loss from bad debts. That would be £153 in round figures, but, as £103 is entered, I deduct £50 more. Then I get £300 a year further for depreciation, making a further deduction, after the £4734, of £485; that leaves what I consider the fair annual value of the works for the future, as they stand, without considering the surplus of £4259. Then I think that, following what has been done on the other side in cases of this kind, which are to be taken into consideration, there is a prospective increase to be allowed for the existing surplus power—that is, taking the retorts and gasholders. I have taken the 18 retorts and the house at £50, making £900, and 200,000 feet gasholder room at £22, making £4400; which makes £5300 structural value, or £265 per annum. I take the land occupied by surplus plant at 40 poles, which, at 50s., is £100 a year, making the gross amount, including surplus, but without reference to what I call absolute surplus land, £4624. Then, if we were dealing with this as a sale in money, of course I apprehend there would be no difference of opinion as to the propriety of adding something in the nature of compulsory sale; 10 per cent. is what I am in the habit of doing, and in this case I think it must depend upon the view which may be taken by the arbitrators as to the question which is raised on the other side—viz., the difference in capital value between the security of the gas-rental and that of an annuity on the town. Therefore it seems to me that if that difference is to be taken into consideration, before doing that it is only right to add the 10 per cent. to the annual value. That would be £462, making £5086 as the starting-point. With regard to the surplus land proper, which is 127 poles, it must be dealt with as distinct from the rest of the works, for the reason that, if you are dealing with the works as they are at present, the land which is not required for the present ought to be dealt with as fair surplus land, which the company may dispose of for any purpose whatever. The value of the land, at £3, is £381. That I take at the same sum, because if it was sold as a feu it seems to me that that is its value without the 10 per cent., because its security is as good, in that respect, as a feu-rent as an annuity. That makes £5467; but if the arbitrators think there should be a rebate, I have taken it off the £5086, but not off the other sum. If it is to be taken without a rebate, then there would be the £4624, to which there is to be added the £381.

Mr. DAVISON: What rebate do you contemplate?

Witness: I hardly know, except that I merely say that in many cases that difference is not quite 1 per cent. upon 4 or 5 per cent.; but in the rebate, what has been generally done, latterly, is that it should be from 5 per cent. to 4½—in other words, 10 per cent.; that is, in fact, adding the 10 per cent. before you go to the difference from 5 to 4 per cent. There is clearly land of value, which is surplus; but this land is not at all necessary to carry on the works to make the production necessary for its enlargement. If there was a view to future extension, I should not advise anybody to sell the land. I think the company ought to be compensated, because the works are taken only at their present production, and not at their prospective increase.

Cross-examined by Mr. LLOYD: I did not see the land before it was taken over by the commissioners; but I do not think that that would alter my opinion, because, assuming that I found a lot of pipes, &c., on it, that mere fact would not show that it was necessary, as it is quite possible that the things might be scattered about, and, therefore, occupy more land than was necessary. I was given to understand that a great part was ground reclaimed from the foreshore. The incomplete and complete pipes for the new works passed through this land. At a cost of a few pounds those pipes may be removed to what we say is not surplus land. I should consider the rate of profit upon the income I have given as free revenue to the company as decidedly excessive, if it showed a net profit of 2s. 6d. per 1000 cubic feet sold. The way in which the retorts are put in beds of three occupies more space than when fixed in fives or sevens, and, therefore, that would involve a rearrangement; but I am taking these works as they stand. The retorts at Dundee are not fixed so as to economize room; but as in every two or three years they can change those retorts, and condense them if they like, they certainly could make as much gas per acre as we do at Salford. The present ground occupied by the retort-house would nearly double the number of retorts.

Mr. *William Thomas Thompson*, examined by Mr. DAVISON.

I have been for the last 32 years manager and actuary of the Standard Life Assurance Company. I have prepared a table showing the fluctuations in the rate of interest on landed securities in Scotland, on Consols, and on bank deposits. I have had great experience in dealing with various securities in Scotland. I have read the Act under which the commissioners are to take the works of the Dundee New Gas Company, and pay an annuity, which is to be backed by a contingent-rate. I find that mortgages of freehold land represent an average of 4 per cent., extending over a period of 60 years. Previous to the term, the capital has been recalled at three months notice, when, if the money is not paid, the mortgagee can sell and pay himself, having also the personal obligation of the borrower—viz., the bond—and the disposition and security applying to the disposing of his lands. If anything, these securities are better than first-class mortgages in England, because we have a more perfect system of registration. I have not the custody of the title-deeds. The deeds are deposited at the Register Office, and then search is made as to the disposition and otherwise. I would leave the fee-simple mortgages in a class by themselves; they are the only class which bear a minimum rate of interest (4 per cent.). In the next class I would put dealing with heirs of entail, where the heir of entail in himself is a proprietor limited to a life rent, and is not actually a life renter, and where you have to effect policies of insurance, and keep them up in connexion with any dealings with him. The recovery is not immediate; you have to sell his life rent, or enter into possession by intimating your intention to the tenant, and you have to pay the premiums, and then produce your bond; the premiums are ensured upon the estate. That is the kind of machinery, and it commands one-half per cent. more. You cannot sell the capital, but may sell the life rent, and enter into possession, gradually reducing the debt, but at the same time keeping up the policies. The amount of the loan upon the life interest is taken into consideration. In the same class I put good house property, because there might be no tenant for a time, and it is always understood that there should be one-half per cent. above the market rate upon the first heritable securities, which, starting at 4 per cent., would be 4½ per cent.—viz., the same rate as dealing with heirs of entail. The advances to heirs of entail under the Drainage and Improvement Acts are about one-half per cent. more—5 per cent. There is a security created by the bond of annual rent. It is repayable in 25 years after the death of the person by a rate bearing 5 per cent. During the life of the heir of entail it is generally limited in this class to 4½ per cent. Seven per cent. pays off the mortgages in 25 years. I have also put into this class advances to towns for sanitary improvements. Debenture bonds ought always to be by themselves, but I have put them into this class on account of the rate of interest, which varies from 4 to 4½ per cent., according to the state of the market. There is also a third class, which I have put under the head of 4½ to 5 per cent. The debenture bonds are payable at fixed periods of from three to seven years; these I have put in a class behind No. 2. Some of the railway companies are getting out their debenture stock at 4 per cent. I do not think that, although companies have got out money at 4 per cent., with the best credit, debenture stock will stand at an average of 4 per cent. in the market. I unhesitatingly put it at 4½ per cent. With respect to gas and water annuities the principle is the same—viz., the selling of an annuity; you go into the market with one for sale, you cannot deal with the company at all. The interest is payable half yearly, and you go into the market to sell, and it is sometimes a difficult security to get rid of. In the case of the Dundee New Gas Company's securities there is no personal obligation, and no capital can be called up; also the annuitant must sell in the market. There is no such basis of security as in first-class mortgages. You do not give the land, and you do not offer anything very tangible beyond a going concern; and in this case there is the possibility of bringing into operation a guarantee-rate. The moment the judicial factor was appointed, the securities would go down to a very different figure from that at which they now stand. The judicial factor, under this Act, is nothing new; it is recognized that he can act, when appointed by the Court of Session. I look upon him in the same light as a commissioner in bankruptcy. As a matter of security, 4 per cent., which is the average of 60 years upon first-class land, is a very different thing from a gas annuity secured by a going concern, which is contingent on a judicial factor. I would willingly invest at one-half per cent. additional; I would not take it at 4½ per cent. I think the moment this guarantee-rate is brought into operation, there will be an inquiry into the mode of conducting the business, and you will be liable to squabbles between the ratepayers and the commissioners. I understand that the Lord Provost and others have power to look after the matter. I also think a sinking-fund would be inoperative—the town would not submit to a tax for it, in order to pay off old obligations. I would invest in 4½ per cent. land mortgages, lending money on the security of the heir of entail. I consider those the more preferable.

Cross-examined by Mr. LLOYD: I do not know what the Dundee public securities sell at, it is such a small affair in the money market. If there is an annuity cast upon the market to sell, I do not know that there is very much distinction between a debenture stock and one of those ordinary gas annuities, keeping in view what I have mentioned already—viz., that one is a public while the other is a private security. The first security is the income from the gas-making. I do not think the rateable value of Dundee is insufficient to provide for any deficiency of gas income, the contingency of the appointment of a judicial factor would therefore be a very remote one. Such an appointment in an extreme emergency would not derogate from the security.

Re-examined by Mr. DAVISON: In England, up to yesterday, the discount rate was 2½ per cent., but in Scotland it was much higher. In Scotland it frequently runs up to 4½ or 5 per cent., and competes with securities, because the money lies at call, and sometimes bears a higher rate of interest than upon securities.

By Mr. HAWKSLEY: I should say that the judicial factor has full power to levy a rate in aid, but he can only act for one year. His particular movement is at an end the moment that he has collected the arrears and has paid them. So that I think that the mere fact of his being in the deed does not derogate from the security, but still the operation of it is not satisfactory. As to the difference between redeemable and unredeemable securities, where you can sell the land and immediately recover your money, I have put it at one-half per cent. more; and in another class—viz., where you cannot recover your capital at all, and must ask for somebody in the market to buy that annuity from you—I put it as worse than second class, and I should say that 4½ per cent. would be the very lowest; 5 per cent. is nearer the fact. Supposing the two securities were in the market, the irredeemable security would get £80, and the redeemable £100; they would both get the same interest. It would not affect the value of these annuities whether the rental value of Dundee was £50,000 or £100,000; £50,000 is enough. Beyond a certain point the additional security is of no use.

By Mr. HAWKSLEY: No doubt the commissioners could put the gas-rent at any price they pleased.

Mr. *Charles Edwards*, examined by Mr. SHIELL.

I am an architect of Dundee of 20 years standing. I have prepared a plan of the works and grounds of the Dundee New Gas Company. The land extends (including the triangle) to 574 poles 6 yards. The part occupied by the works is 401 poles 11½ yards. The part fronting Dock Street is 127 poles 24 yards, and the extent of the works, on the section on the south of the Dundee and Broughty Ferry Road is 21 poles 16 yards. On the west section there are 7 poles 13 yards. The triangular part to the north of the Broughty Ferry Road is 16 poles 2 yards.

Cross-examined by Mr. PHILBRICK: I have not taken the piece down by the lodge near where the little crossing comes in; that is, where the siding comes in from the railway. This plan is from actual survey.

Mr. *Jabez Church*, examined by Mr. DAVISON.

I was witness in the Dundee Old Gas Company's case. I have three quantities of surplus land—viz., land occupied by a portion of the retort-house (8 poles 15 yards), land occupied by part of the gasholder (56 poles), and the unoccupied portion fronting Dock Street (127 poles 24 yards). There are, in my judgment, more retorts and storeage power than are necessary to produce the present make. The whole structure is in excellent repair. Last year, ending April, was exceptionally bad for residual products, and a dear year for coals. I have tried

to arrive at a net annual value, taking credit for what is capable of doing more work, and giving credit for what requires alteration and improvement, and I arrive at £5683. I adopted the rectified balance for the year ending April 30, 1868. My figure for the residual products is £400. I put coal at 3s. per ton for the reduced cost. I add for meter repairs 2½ per cent., that is £135 2s. 6d; bad debts 1½ per cent., £104. The net profit of £3544 1s. 10d. is arrived at after deducting £103, which latter sum represents 1½ per cent. on the gas sale. Then for "transfer fees" (one-half per cent. on structural value) £4, as a depreciation and renewal fund. That makes £493, leaving £4411 to carry forward. Taking the prices of the surplus land, it works out at £526 10s. per annum. Retorts £25 each. They are in beds of three, which makes them more expensive. You might double their number in the same house and the same beds. I take gasholder storeage at 178,000 feet excess, and value it at £3738, and that surplus power, capitalized at 20 years purchase, produces £292 4s.; and adding 10 per cent. upon the figure I then get, I arrive at my total.

Cross-examined by Mr. PHILBRICK: I estimate 19s. per ton as the normal price of coal. Reduced cost of gas does not necessarily mean reduced cost of coal. When the price of coal is high, coke is high in proportion, and that to some extent neutralizes the effect of varying prices. Coke from cannel coal is a very small item. It is nearly all cannel that this gas is made from. Residual products are of small consequence as regards price; the chief value is from naphtha and ammonia. I have taken the amounts actually received for gas and meter rents *minus* discounts and bad debts, therefore the sum I have operated on is the net annual value. A well-constructed meter would last from 15 to 20 years, and a tin-cased one 15 years. I have not measured the cart entrance in the surplus land. There is an entrance in East Dock Street—a mere garden path—which is included in the 127 poles. In measuring the surplus land I came up to the governing-house within about 4 feet. The nearest point we come to the large gasholder is 12 feet; 54 retorts—the number used—is a fair number to produce 400,000 feet of gas per 24 hours.

Mr. LLOYD: That is what Mr. Spice puts as the maximum make.

Cross-examination resumed: These retorts are capable of producing 7000 feet per day. They are single throughout, none of them longer than 8 feet. If they were put five or six in a bed we should often be able to double the retort power. I have seen retorts so placed working with cannel.

Re-examined by Mr. DAVISON: The larger the consumption, the less price gas will be manufactured at. For residuals the company had, in 1865, £1632, and in the year taken, only £1000. It is a well-known fact that in the market naphtha is fetching double the price it was.

Mr. *G. W. Stevenson*, examined by Mr. DAVISON.

My estimated value for the annuities is £5325 9s. 5d. I take the rectified balance-sheet of Mr. Guild. I add 2s. 6d. per ton for saving on coal. My surplus retorts and buildings are the same as those of other witnesses. I put 2½ per cent. for repairs of meters in use, less what is allowed, 1½ per cent., for bad debts, and one-half per cent. for depreciation. I add 10 per cent. for compulsory sale. My figure for net profits is 1s. 6d. per 1000 feet on gas sold. If I take off £484 for compulsory sale of land, and £439 10s. for surplus land, it makes 1s. 3d. per 1000 feet for gas sold.

Cross-examined by Mr. LLOYD: The meter-rents and residuals have to be deducted before you get the profit on gas sold. The interest on the mortgage bonds and the additional debt have all gone in the working of the concern, and in the annual profits. I differ from the other estimates as to the surplus storeage. I know the necessity of having a storeage equal in capacity to the largest daily make, therefore I allow it, and only carry the rest to the surplus. That accounts for the difference between my £2100 and Mr. Spice's £4356. I take actually, as surplus storeage, 99,000 or 100,000 feet. The annual value of the surplus land I take at £439 10s., against Mr. Church's £526 10s. I have less surplus land in connexion with the gasholder. I have only 13 poles at 60s., which makes £39. I have taken off a feu duty on the surplus land on which the retorts stand. They do not pay any feu duty on that land in front of Dock Street. I usually allow 1 per cent. for depreciation, but these works are so substantially erected that I consider one-half per cent. enough. The pipes will be the same in any case in any town, supposing them to be good when they were laid down, and that the soil such as not to cause great oxidation or rapid deterioration. The gasholder-tank is more than usually substantial in its character, and the gasholder itself is perhaps the most weighty structure of the kind I ever saw. The two smaller ones are not at present in very good conditon. I know nothing practically of the condition of the mains and pipes. There are a great many more services than there ought to be. I have put the one-half per cent. for renewal of works, mains, and services, as well as for depreciation. The services do not cost much money, and it would pay, in most cases, to take out and replace them every five or six years, or at most every ten years. If this were done every five years it would be £500 a year, and it might pay the company to do that. I think the whole of the cost of laying pipes and services should, in the first instance, go to capital, and wear and tear to revenue. In the case of substitution, I should charge the difference in cost—between, say, a 6-inch pipe in the ground and a 12-inch pipe which is laid in place of it—to capital. I should certainly not take bodily the whole account and place it to capital.

Re-examined by Mr. DAVISON: There is a leakage of 23 to 25 per cent., and the cost of renewal of service-pipes every five years, at £500 a year, would be more than returned by the saving.

Mr. LLOYD: If that leakage were due entirely to service-pipes.

By Mr. DAVISON: The 1s. 3d. I arrive at as the profit upon gas sold is after taking the cost of the gas and attributing to that what is attributable.

Ebenezer Goddard, Esq., examined by Mr. SHIELL.

I have made a valuation of this undertaking. I add £400 "on account of the exceptionally low value of secondary products this year." I am now getting 4s. 9d. per gallon for naphtha upon a contract made ten months ago. I was then selling it at 2s. 6d., and it is now being sold at 5s. 6d. Sulphate of ammonia was also abnormally low at the same time. My total valuation is £5544 13s. 2d.

By Mr. HAWKINS: I think the price of ammonia is likely to go up. It is in increasing demand.

Mr. *Alfred Penny*, examined by Mr. DAVISON.

My valuation is £5494 14s. 2d. It may be reduced £18, because in my surplus land I have taken 133 poles, instead of 127. The profit per 1000 feet of gas on a sale of 52 million works out 1s. 6d. as nearly as possible, making the deductions as I have done, and then there would be the deductions for the 10 per cent. compulsory sale and the land, leaving 1s. 2d. net profit on gas sold.

By Mr. LLOYD: I have not taken off the amount of gas consumed on the premises. I have taken what they have got money for.

By Mr. DAVISON: I take off 6 poles, but I do not give up the triangular piece.

By Mr. HAWKSLEY: In the expenditure I have included all ordinary repairs. I should think the buildings and tanks would last perhaps 200 years. I can see no end to their life, from the strong and efficient manner in which they are built. I will say 50 years for the life of the gasholder, properly taken care of. The others are not in such good condition, but I think they have been ill used. They might last 30 years; they have lived 20 already. Any time might be taken for the cast-iron condensers, and so on—they will never wear out. The purifier covers and such like will wear, but that is provided for in the ordinary repairs. I should take 80 years for the life of main-pipes, and for services 10 or 15 years.

Mr. HAWKSLEY: Then am I to understand that, having guessed generally at one-half per cent., it ought to be so rectified that the sum to be deducted ought to be such as will renew all these different articles at the end of their remaining lives?

Witness: Yes; that is what I mean.

FOURTH DAY—SATURDAY, NOV. 6.

Mr. *J. W. Guild* recalled, and re-examined by Mr. DAVISON.

I have gone over the quantity of coals shown to be carbonized in the gas-book, the coal used as fuel for retorts and engines, and coal used for fuel. A very imperfect system of calculating the consumption was in operation till Mr Macrae's management. Last year the weighing was so accurate that the only difference was about 19 tons over the whole year. The books show 6457 tons for 1867-8. According to Mr. Penny's data, 75 years represents the average life of that £50,000 worth of property upon which depreciation is taken. Taking 75 years, £1 works out £39 at 5 per cent. £1 paid now will be £39 accumulated at the end of 75 years at 5 per cent. £1274 will, at the same rate, in 75 years, be £50,000. Supposing £1274 were taken off the capital to pay them £1274, it would, at 5 per cent. per annum, be a deduction from the annuity of £63 14s. A capital sum now of the annual value of £63 14s. would produce £50,000 in 75 years. The £250 put by Mr. Penny would produce £200,000 in 75 years.

Mr. LLOYD then addressed the arbitrators on behalf of the commissioners. He assumed that the matter was reduced to a simple issue—viz., what was the fair earned net revenue of the undertaking at the time when it was to be handed over to the commissioners. He understood the capitalization would be another matter, and the reduction of that again to annuities a third. He did not see (except incidentally) how the question of a rectified balance could come in at all. What they had to do with was the corrected revenue account, and that seemed to be all, except in so far as the extent of the depreciation might enter into the question, and the amount at a given rate. There was no doubt a controversy between the parties as to the existence of the debt—whether it was right to carry back from capital to the credit of revenue that which from time to time had been appropriated as between revenue and capital, and so to make a sort of suspense account of the £6269, which it was now alleged was distributable among the shareholders, and which the company made a debt to the bankers. That was a matter into which, inasmuch as it did not affect him practically, he did not intend to go. The commissioners were willing to pay, and it signified nothing the way it was done. They did not dispute the principle of Mr. Guild's valuation respecting meter-rents, and if it had been all accurate there would have been no question about it, as he would show the sum of £500 odd, which appeared to the credit of the meter-rents, could not stand. He denied altogether the right to add anything on account of the "exceptionally low value of secondary products" in that year, and the high price of coal. He contended there was no surplus land. He admitted a certain excess of retorts, but would bring evidence to diminish the estimate of the other side. It would be shown that there were a great number of things omitted, and one question, of course, would be upon the amount of depreciation. A sufficient amount had not been assigned to keep up the works *de anno in annum* in an effective working state. Mr. Spice had taken the per centage upon £50,000 as representing the total structural value. Of course, if the commissioners adopted that, and put their rate of depreciation upon that, it would be so much the better for them. Honestly, however, they could not do that. They did not admit there was that structural value at all, and therefore they placed their rate of depreciation upon a less total value. He denied altogether the item of compulsory sale. Then as to the question as to how the property was to be valued for the purpose of arriving at the annuities, the evidence given on the former occasion would be repeated, and they would have to judge which of those estimates to adopt. With respect to the value of the capital stated at £40,000, Mr. Davison had said it was merely the relative proportion between the two companies, and did not represent the actual value. Now, Mr. Paterson had given it to him (Mr. Lloyd) that he had valued them according to what they were really worth as an asset of the company.

Mr. HAWKSLEY: I may mention that it does not, in my mind, signify one straw what their capital was.

Mr. LLOYD said he quite agreed in that. Then, of course, he deducted what the other side did not—viz., interest on capital also. A company like this could not start as a concern without having something in hand. If they borrow money, they pay the interest; if the money is their own, they lose the interest. It did not matter how it was manipulated afterwards, but it would never come back. There must be a certain outstanding floating capital necessary to carry on such a concern, and he would appeal to any commercial man in the kingdom whether it would be possible for any person or company to begin a concern of this kind except either by getting accommodation at their bankers, which they must pay for, or by having the capital of their own to start with. There were two other points. One was respecting the tramway, which was a matter of mere indulgence, and might be taken away at any time. The commissioners charged 6d. upon the price of coals in respect of that tram, and it was curious to find that, from the time they got the use of it, the cost of coals decreased more than 6d. There was a further question which arose from the violation of the express contract which the company had entered into with Parliament not to do anything to interfere with the competition of the old company, and to deprive the public of that benefit. They did, no doubt, make an arrangement amongst themselves to make a common purse, and to enable them to put a higher price on their gas, and mulct the public for their own benefit. He had no hesitation in calling it an illegal arrangement, and one which they never could have brought before Parliament. They could not have got an almagamation bill, or even a money bill, and they would have been in the predicament of owing a great deal of money which they had, *ultra vires*, borrowed, and which they could not raise the money to restore. Some allowance was to be made for that. Taking it any way, it would have reduced the price to a normal amount—say from 5s. 4d. to 4s. 8d. He would show that the effect of that had been to put improperly into the pockets of shareholders a profit which they would not otherwise have earned. As to the statement of what the commissioners had earned, if any prejudice arose out of that, he (the learned counsel) was prepared to show that a very much smaller amount had been the result of the year's working, and that the amount of gas sold had been considerably less. They, of course, had been compelled to reduce the price and increase the illuminating power, as the public would not stand what they were doing before.

Mr. *G. A. Jamieson*, examined by Mr. PHILBRICK.

I have examined the accounts of both companies. Prior to the establishment of the new company, the price of gas was 8s. 3d. per 1000 feet. When the new company obtained their bill in June, 1846, it was reduced to 6s. The 58th section of their Act makes it unlawful for them to do anything whereby the beneficial action of competition should be impeded or obstructed. From 1847 to 1851 the price of gas in Dundee was 6s.; from 1852 to 1861 it was 5s. 6d.; from 1862 to 1865, 4s. 10d.; and from 1865 to December, 1866, 4s. 8d. It was raised on December 1, 1866, to 5s. 2d.; and on December 11, 1867, to 5s. 4d. I have prepared a statement showing the actual sums carried from revenue by the company in their own books for depreciation, exclusive of the surplus meter-rents. Taking the average of the 22 years during which the company carried on its works, £214 16s. 3d. was written off annually, being an average of 11s. 11d. on the capital. The surplus meter-rents had always been carried to the meter account, and had never appeared in revenue until last year. I have prepared a statement showing the total cost of the meters and surplus meter-rents until last year, when there was a capital adjustment. It shows cost of meters, £12,891 7s. 2d., from which they have written off, by application of the surplus rental, £5138 14s. 7d., so that they stood in their books at £7752 12s. 7d. The cost of repairing and altering the meters in 1868 was £758 6s. 6d., and the company, in dealing with that sum, have put £682 10s. to capital and £75 16s. 6d. they have charged as ordinary repairs against the meter account.

The meter-rents actually received were £600 5s. 8d., so that the balance they carried to the year 1868 for meter-rents was £524 11s. 2d. It appears from a note in the books by Mr. Macrae that £682 10s. 3d. was expended on the meters in that year. I assume there are 8000 meters, and, taking them at 15 years life, 533 ought to be renewed annually; and assuming the average cost per meter £1 when new, it would give £533 a year. It has cost the company, on the average, £180 a year for repairs of meters for the three years preceding 1867. Taking that sum, and adding it to the £533, it makes about £721. In the abstract of capital account of 1868, £108 14s. 1d. was written off for depreciation from revenue, which was really taken out of the revenue of the previous year.

By Mr. HAWKSLEY: The £188 does not include any part of the cost of bringing the meters within the meaning of the Sales of Gas Act.

Examination resumed: In the year 1868 nothing was written off for depreciation out of the revenue of 1868. A depreciation of 1 per cent. would represent an annual sum of £520 7s. 3d. on all the outlay, exclusive of the meters and of the parliamentary and preliminary expenses. The surplus meter-rents and the sums received from revenue towards reduction of capital outlay have been carried to the reduction of capital on the recommendation of the directors, and with the formal sanction, annually repeated, of the shareholders. There was a distinct appropriation of these specific sums to meet the depreciation on their works. Under the head of "Depreciation," the sum should stand at £533, and then I take the buildings and plant at 1 per cent. on the actual cost, giving £520 7s. 3d. I substitute £533 17s. for the £399 I have in my statement, and the repairs remain—call it "Renewal." Then the next item is "Allowance for bad and doubtful debts," which is obviously understated in the accounts of the company for this year, and I charge 2½ per cent. on the revenue, making a difference of £240 16s. 6d. I take £5000 as the "interest of capital necessary for the conduct of the business," the interest of which, at 5 per cent., is £250. For the "effect of competition prescribed by the company's Act, but evaded by it," I assumed £350. The "value of surface crossing into works," to which the company has no title, I take at 6d. per ton, altogether bringing out a surplus revenue of £2168 15s. 4d. I deduct from the capitalized amount the £11,850 of mortgage debt, and there would have to be deducted, on the understanding that has been come to, the £6269 4s. 3d. besides. The accountants on the part of the company include the interest on the debt as a charge against the working, which, in the former case, was dismissed as erroneous, and in this case seems equally erroneous.

By Mr. HAWKSLEY: I allude to the debt they claim from the commissioners, £18,000. The working of the company must produce a revenue which is to yield both interest of the debt and dividend to the shareholders; and what has to be ascertained is the worth of the concern which is to yield that revenue, and then from that you pay its debt. I assume that these two debts are to be paid by the commissioners out of their borrowed money. I put the privileges of this company far below those of a railway company, both practically and legally.

Mr. PHILBRICK here said, regarding the item the company took credit for of secondary products, they had year after year, from 1865, been buying enormous quantities of gas tar, and distilling it, and carrying on another trade in fact.

Mr. POWNALL: You are going to have the benefit of that trade.

Mr. PHILBRICK: No; we cannot do it. We are a public body, and have only power to carry on gas-works.

Mr. POWNALL: Is this a large item—do you attach importance to it?

Mr. LLOYD: £400, which capitalized amounts to a considerable sum.

Examination resumed: I find from the day-book of 1865-66 that the company were then buying from other parties large quantities of tar.

Mr. POWNALL: We are dealing with 1868.

Mr. LLOYD: In the year 1868 the residual products produced less than the normal result. The object is to show that though in previous years a larger result appears in the books, yet it is the result of a trading in residual products.

By Mr. PHILBRICK: In 1864-65 they bought 93,203 gallons; in 1866-67, 81,322; and in 1867-68, 7681. I have a statement of the bad debts. [Handed in.] I bring out the estimated working capital of the commissioners to be £16,000. I have prepared a statement showing the result of the commissioners working up to the 30th of September, 1869, and the result as far as gas-making to the 30th of October, 1869. They have made less money than was anticipated by £2287 11s. 9d. upon the mere working, without allowance for anything else. According to the estimate put in, the total make of gas was 212,226,400. We corrected that, because we found their make had been somewhat more, and we made it 217 millions in the last case; that was up to the 30th of April, and the corresponding sales were also corrected to 133 millions. Upon the same basis we corrected the estimate for the rest of the year, and we made the manufacture of gas then 80 millions, and the sales 59 millions for both companies. For the commissioners the actual make of gas now has been 70,815,240, and the sales in the same proportion have been 522,10,460. I have estimated the make in the intervening twelve days (the 31st of October to the 11th of November) by the six days of October before the 31st, and twelve days of November after the 11th, and have taken the average. That shows a decrease of sales of 7,778,000 feet less than (in last June) we anticipated we should make. There is a decrease of 2½ per cent. in 1869 in actual working.

By Mr. HAWKSLEY: That is in make. I have not the means of ascertaining the sales, because they were not brought up to that point.

By Mr. DAVISON: The companies made £13,658 4s. in 1868, as against £13,139 3s. 6d. made by the commissioners in 1869.

Cross-examined by Mr. DAVISON: My balance of £610 is 1·099 on £55,000.

Mr. DAVISON: Will you take off the £17.000—take off the £11,850 and the £6269? Can the commissioners borrow at 4 per cent.?

Witness: Yes. Taking 4 per cent. on that it would be 724·76, and adding it to the £610, £1334; £1334 on £55,000 is 2·42. Assuming that this £1334 is a dividend, it would turn into £888 19s. 7d. as an annuity. My figures and Mr. Guild's are practically the same as far as the revenue of £15,353 and the charges of £11,210 go, except with the two alterations I have mentioned. As to repairs of meters, I picked out the three years in which the meters were being readjusted for the Sales of Gas Act, and we had to find out how much of the expense was for readjustment, and how much for repairs. I have practically carried the adjustment of meters to capital, because I have only debited the income with the expense of repairs. I have taken the depreciation at 7½ per cent. It is my own imagination. I have taken "Bad and doubtful debts" over the whole 23 years. I thereby gave the benefit of the period of no competition, as well as the period of competition; if I had taken the period of no competition alone it would have been much larger. I deal with the concern as I find it. There may be surplus value. I have added nothing. I have dealt with it as an accountant. I took the new company's working capital at £5000 (without any relation to the old company), because I thought it was a fair sum. At the close of 1868 they had £7500 outstanding. If the new company had been working with the old company in the past year, the former would have made, with the reduction of price and raised illuminating power, £2379.

Mr. DAVISON: And that is, after deducting depreciation, £399 for the new company only on meters, which is to be added to the 30 point something of £1150 16s. 4d. for meter repairs. Tell me what 30 per cent. of that £1150 is—£345, I am told?

Witness: Yes. That is for meter repairs and restoration. The £520 "On works and pipes," which is to be added to 30 per cent. of £720, would produce £50,000 in 20 years. I have taken off £1200 for discounts. That is on the same footing as if the commissioners allowed discounts the whole year. The company allowed them. The commissioners did not for the first six months. When the price was 5s. 4d. there were no discounts, and when it is 5s. there are. I have seen Mr. Guild's table of working capital. There are many faults in it. Figures even would not convince me that you can carry on a business of £50,000 without capital. The operations of the commissioners will unquestionably be very different next year from that. They will then be in normal working condition. They have paid nothing for stores. They bought the stores of the old company, and they should have paid for them on the day. The valuation was delayed from circumstances foreign to an inquiry such as this, and they did not pay for them till April or May. Mr. Macrae and others will not have their full salaries till about the 11th of November.

Mr. LLOYD: As to the £2300 odd, you show that a portion of that would have come to the company if the commissioners had been working—that is, irrespective of the £18,000 to be paid by them.

Witness: It is irrespective of all that. Take off the £18,000, and it brings me back to nearly the same figure.

Mr. *William Stiven*, examined by Mr. MICHAEL.

I am an accountant of considerable experience in Dundee. I have, with Mr. Jamieson, made up the statements he has put in, and agree to them. I have framed a statement relating to the coal contracts entered into with the Gas Commissioners [handed in], also a statement showing the unaccounted-for gas during the last four years. The per centage was, in 1864-5, 23·304; the next year, 23·259; in 1866-7, 21·809; and in 1867-8, 24·796. In December, 1867, there were 54 retorts used.

Mr. *William Foulis*, examined by Mr. PHILBRICK.

I am engineer of the Glasgow Gas Committee. I have made an examination of the pipes, mains, works, meters, and service-pipes of the new company. There are 78 retorts and 26 ovens. Dealing with the coals now used, I find the total make, allowing 10 per cent. for surplus retorts, is 491,000 in four hours. The average make at the four principal towns in Scotland would be 423,000 feet.

By Mr. HAWKINS: The actual producing power is 10,700 feet. They are using a high class of cannel coal in Dundee. That is being rapidly exhausted, it is prospective value they are valuing. Boghead coal will be exhausted in about two years, and the Lesmahago in about ten; so that in about eight years they will be obliged to use inferior coal, and have a larger number of retorts to make the same quantity.

Mr. LLOYD said he objected to the 2s. 6d. a ton, because he maintained that coals would not be reduced in price, and the amount of production from the coal which had been hitherto used might not continue, because the commissioners might be obliged to use an inferior quality of coal which would produce a less number of cubic feet.

Examination resumed: As a practical gas engineer, I could not say there was any surplus retort power.

By Mr. HAWKSLEY: They have 18 retorts above what they use. That is to say, deducting 10 per cent., they have a surplus of 18.

By Mr. PHILBRICK: The total valuation of the original cost is £47,509 for buildings, plant, mains, services, and meters; total depreciation, £9655; leaving £37,854 1s. 11d. the present value. There is no ground which the commissioners can dispense with.

By Mr. HAWKSLEY: Taking the depreciation at 40 years at 5 per cent., it would accumulate to £68,000.

Mr. HAWKSLEY: That is a vast deal more than all the perishable plant, excluding meters and services, out of the £47,000. Supposing, besides that, £550 per annum is deducted, how much would that amount to in 42 years?

Witness: £66,000.

Mr. HAWKSLEY: Whether that is so or not, then you would get £66,000, *plus* £68,000, by way of the restoration of a plant which amounts to only a part of £47,000.

Witness: I cannot see it in that light, really.

Mr. HAWKSLEY: I do not ask you to see it in any light; that is the result of the figures, certainly.

(To be continued.)

Miscellaneous News.

CITY OF LONDON GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting of the Proprietors of this Company was held at the Offices, Dorset Street, Salisbury Square, on Wednesday, Feb. 2—ROBERT ALEXANDER GRAY, Esq., in the chair.

Mr. MILLAR having read the notice convening the meeting, the corporate seal was affixed to the register of proprietors.

The minutes of the last half-yearly general meeting, and of the special meeting held in December last, were also read and confirmed.

The SECRETARY read the following report of the board of directors, and the statements of account approved by the auditor appointed by the Board of Trade were then presented:—

Gentlemen,—Referring to the proceedings of the extraordinary general meeting held on the 29th of December, the minutes of which have now been read, your directors report that, under the instructions of the resolution then passed, they have accepted the resignation of the secretary, granting him a retiring pension equal in amount to the salary he has been receiving. Mr. Millar has, at the request of your directors, consented to discharge the duties of his late office so long as the interests of the company may require the same. In the other matter referred to at that meeting—viz., the amalgamation of this company with the Chartered Company—when you resolved that, with certain modifications, the scheme then submitted should be adopted, your directors report that this was duly forwarded to the Board of Trade. This led to a correspondence resulting in a proposition from that department, which, differing in some measure from your resolution, necessitates the calling of another extraordinary general meeting agreeably to the notice you have received. Your directors have fully considered the subject, and will be prepared at the proper time to recommend that the clause proposed by the Board of Trade be accepted.

In reviewing the operations of the half year, your directors do not notice anything requiring especial attention. The works have been maintained in thorough efficiency, and the testimony of Dr. Letheby, in his recent report on the gas supplied to the City, "that the gas supplied by this company has fulfilled in all respects the requirements of the Act of Parliament," is the best comment on the strenuous efforts of your directors and officers faithfully to discharge their obligations to the public.

The accounts for the half year, duly certified by your own auditors and the official auditor, are appended. The rental is £54,111 3s. 5d., being an increase of £5174 6s. 9d. over the corresponding period of 1868. The profit and loss account, your directors are pleased to observe, is also satisfactory. The profit for the half year, after paying all charges, including a gratuity to the officers according to their period of service, which your directors feel assured will meet with the hearty concurrence of the shareholders under the special circumstances of the case, is £17,468 10s. 2d.; this, added to the amount brought forward at Midsummer, after deducting therefrom the balance due by the late treasurer and the former tar contractor, leaves £17,784 13s. 9d. now at your disposal. Out of this amount your directors recommend you to declare a dividend for the half year as follows, viz.:—On the A, and such portions of the new shares as have been called up, at the rate of £10 per cent. per annum, and on the B shares at the rate of £4 per cent. per annum; the whole to be payable, as heretofore, free of income-tax. After the payment of this dividend there will remain an unappropriated balance of £1118 15s. 4d.

Your directors close their report by a brief reference to the present position and future prospects of the company, over whose interests some of their number especially have watched for many years, during which period they feel, and cheerfully acknowledge, they have enjoyed the utmost confidence of the shareholders.

In prospect of the amalgamation which has on several occasions been brought under your notice, and which the directors believe may now be considered as virtually settled, they anticipate this is the last report they shall have to present.

They congratulate you on its very favourable character, and look forward yet to serve you and watch over your interests when associated with their new colleagues in directing the affairs of the united company. As one important element towards the prosperity of the new company, they trust the kindly feeling and cordial confidence which has, from the commencement, marked the history of the City Company will continue unabated between the executive and constituency of the amalgamated company.

THE CITY OF LONDON GASLIGHT AND COKE COMPANY,

Half Year ending December 31, 1869.

A.—STATEMENT OF SHARE CAPITAL, *on December* 31, 1869.

Acts of Parliament authorizing the Raising of Capital.	Description of Capital.	Maximum Dividend authorized.	Number of Shares issued.	Nominal Amount of Shares.	Called up per Share.	Total paid up.	Amount issued but not called up.	Remaining to be issued.	Total Amounts authorized.
The City of London Gas Company's Act, 1859.	A shares.	£10 per cent.	10,000	£20 0 0	£20 0 0	£200,000	..	Nil.	£200,000
	B shares.	4 ,,	10,000	10 0 0	10 0 0	100,000	..	Nil.	100,000
	New shares.	10 ,,	8,000	10 0 0	10 0 0	80,000	..	Nil.	100,000
	New sh., 2nd iss.	10 ,,	2,000	10 0 0	5 0 0	10,000	£10,000*	Nil.	
									£400,000

* Amount paid in advance of calls on new shares, 2nd issue, £6825.

B.—STATEMENT OF LOAN CAPITAL, *on December* 31, 1869.

Acts of Parliament under which Borrowed.	Description of Loan (Mortgage Bond or Debenture Stock).	Rate per Cent. of Interest.	Total Amounts borrowed at Dec. 31, 1869.	Remaining to be Borrowed.	Total Amounts authorized.
The City of London Gas Company's Act, 1859.	Bonds.	£5 per cent.	£60,000	Nil.	£60,000

Total share capital called up (*see* A)	£390,000 0 0
Total loan capital borrowed (*see* B)	60,000 0 0
Total capital received	£450,000 0 0

C.—CAPITAL ACCOUNT, *for the Half Year ending December* 31, 1869.

Dr. *Cr.*

Expenditure.	Expenditure from June 30, 1869.	Expended this Half Year.	Total to Dec. 31, 1869.	Receipts.	Certified Receipts to June 30, 1869.	Received during Half Year.	Total Receipts to Dec. 31, 1869.
	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.	£ s. d.
To Expenditure to June 30, 1869	439,917 12 0	..	439,917 12 0	By Ordinary shares of £20 each	200,000 0 0	..	200,000 0 0
Since June 30, 1869—				Ditto of £10 each	190,000 0 0	..	190,000 0 0
Lands acquired, including law charges	..	..	—	Bonds	60,000 0 0	..	60,000 0 0
New buildings, manufacturing plant, machines, storage works, and other structures connected with manufacture	..	..	—	Amount received in anticipation of calls	6,525 0 0	300 0 0	6,825 0 0
New mains, including laying, paving, and other works connected with distribution	..	452 7 10	452 7 10				
Meters (additional), including fixing	..	..	—				
Parliamentary costs	..	..	—				
Special items (if any)	..	..	—				
Total expenditure			£ 440,369 19 10				
Balance of capital account			16,455 0 2				
			£ 456,825 0 0	Total			£ 456,825 0 0

D.—REVENUE ACCOUNT, *for the Half Year ending December* 31, 1869.

Dr. *Cr.*

Expenditure.	£ s. d.	£ s. d.	Receipts.	£ s. d.	£ s. d.
To Manufacture of gas—			By Sale of gas—		
Coals, including carriage, trimming and dues, and all expenses of depositing same on works	24,112 12 3		Common gas (244,085,915 cubic feet), at 4s. per 1000 cubic feet	48,817 3 8	
Purifying materials, water, &c.	440 0 9		Cannel gas (11,219,348 cubic feet), at 5s. 6d. per 1000 cubic feet	3,085 6 5	
Salaries of engineer, superintendents, and officers at works	640 0 0		Public lighting and under contracts	2,208 13 4	
Wages at works (manufacture)	7,488 10 6			54,111 3 5	
Repairs and maintenance of works and plant, including renewal of retorts, machines, apparatus, materials, and labour	1,521 0 0		Rental of meters	Nil.	54,111 3 5
	34,202 3 6		Sale of residual products—		
Less old material sold	45 16 10		Coke (Account H)	7,158 17 8	
		34,156 6 8	Breeze ,,	108 15 10	
Distribution of gas—			Tar ,,	1,690 14 5	
Repair, maintenance, and renewal of mains and service-pipes, including materials, laying and paving, and labour	1,569 8 8		Ammoniacal liquor	447 11 3	
Salaries of inspectors, assistant inspectors, and clerks in Light Office	672 17 0				9,405 19 2
Meters—repairing, renewing, and refixing	1,950 5 1		Rents	..	187 0 0
		4,192 10 9	Transfer fees	..	4 6 0
Public lamps—			Other item—interest	..	17 19 4
Lighting and repairing	..	738 8 6			
Rents, rates, and taxes—					
Rents	557 10 4				
Rates and taxes	785 7 5				
		1,342 17 9			
Management—					
Directors allowances	600 0 0				
Salaries of secretary, accountant, and office clerks	776 13 4				
Collectors commission or salaries	435 0 0				
Stationery, printing, and general establishment charges	1,261 17 2				
Company's auditors	54 12 0				
		3,128 2 6			
Public officers— (*Company's Proportion.*)					
Gas referees, Chief gas examiner, Official auditor	..	320 19 1			
Law and parliamentary charges—					
Law	..	93 12 1			
Parliamentary (*oppositions*)	..	—			
Depreciation-fund for works on leasehold lands	..	—			
Bad debts	..	812 10 5			
Other items	..	—			
Total expenditure		£ 44,785 7 9			
Balance carried to net revenue account		18,941 0 2			
		£ 63,726 7 11	Total receipts		£ 63,726 7 11

E.—PROFIT AND LOSS ACCOUNT (NET REVENUE), *for the Half Year ending December* 31, 1869.

Dr. *Cr.*

	£ s. d.		£ s. d.	£ s. d.
To Interest on bonds accrued to Dec. 31, 1869	1,497 10 0	By Balance of net revenue, June 30, 1869	17,761 0 1	
Forfeitures incurred during the half year	None.	Less dividends declared for the half year ending that day	15,213 2 6	
Insurance-fund, at per cent.	—			2,547 17 7
Income-tax	415 8 4	Balance from Revenue Account (D)		18,941 0 2
Loss by failure of Sir C. Price and Co., &c.	1,816 5 8	Interest on deposit		25 0 0
Balance of net revenue	17,784 13 9			
	£21,513 17 9			£21,513 17 9

F.—INSURANCE-FUND ACCOUNT. (There is no insurance-fund.)

G.—STATEMENT OF COALS, *during the Half Year ending December* 31, 1869.

Description of Coal.	In Store, June 30, 1869.	Received during Half Year.	Carbonized or Used during Half Year	In Store, Dec. 31, 1869.
	Tons.	Tons.	Tons.	Tons.
Common	3,482¼	28,379¼	27,331¼	4,530¼
Cannel	692	2,714¼	2,651¼	755¼

H.—STATEMENT OF RESIDUAL PRODUCTS *made and disposed of during the Half Year ending December* 31, 1869.

Description of Residual.		In Store, June 30, 1869. Estimated.	Made during Half Year. Estimated.	Used in Manufacture during Half Year. Estimated.	Sold during Half Year.	In Store, Dec. 31, 1869. Estimated.
Coke—						
Common	chaldrons.	180	27,286½	9,840	18,014½	450
Cannel	,,	—	2,022½		1,172½	12
Breeze	,,	60	2,311½	..	2,171½	200
Tar	gallons.	3,672	290,952	..	282,852	11,772
Ammoniacal liquor	butts.	86	5,718	..	5,544	260

Dr. GENERAL BALANCE-SHEET, *on December* 31, 1869. *Cr.*

	£ s. d.		£ s. d.	£ s. d.
To Capital account—		By Cash at bankers	..	6,650 8 10
Balance at credit thereof (Account C)	16,455 0 2	Ditto on deposit	..	—
Profit and loss account—		Ditto (petty)	..	3 15 0
Balance at credit thereof (Account E)	17,784 13 9	Stores on hand, viz.:—		
Insurance-fund account—		Coals	4,153 5 5	
Balance at credit thereof (Account F)	—	Coke and breeze	199 18 0	
Unpaid dividends	420 18 10	Tar and other products	88 3 0	
Interest accrued and unpaid on bonds, to Dec. 31, 1869	1,497 10 0	Sundry stores	1,769 10 6	6,210 16 11
Amount due for coals and to sundry tradesmen and others, to Dec. 31, 1869	21,835 2 7	Outstanding accounts due to company, viz.:—		
Ditto for wages and contingencies, to Dec. 31, 1869	Nil.	Gas-rental	40,057 8 4	
Deposits made by consumers	417 12 5	Coke and other residuals	5,183 13 9	
Special items—Mr. Benham's benevolent fund	1,162 10 0	Sundry accounts	1,467 4 11	46,708 7 0
	£59,573 7 9	Special items	..	—
				£59,573 7 9

I certify that the balance of net revenue of the City of London Gas Company, for the half year ending Dec. 31, 1869, is £17,784 13s. 9d., and that such amount is applicable for the payment of dividend on the ordinary shares.

(Signed) JOHN THOMAS HADLAND, WILLIAM FORTESCUE, *Auditors of the City of London Gas Company.* (Signed) CHARLES H. PARKES, *Official Auditor.*

January 31, 1870.

The CHAIRMAN: Gentlemen, I assure you it is very gratifying to the directors to be in a position to make so favourable a report to you to-day of the proceedings of the company during the past half year; and it is peculiarly gratifying to us to know that we stand very high in the estimation of the citizens of London, for in former times they bestowed very tardy gratitude upon us. We have lived through periods when we suffered much from vituperation, and were only supported by the consciousness that we never deserved it, and that a time must come when even by our bitterest opponents ample justice would be done to us, and the integrity of our motives would be satisfactorily demonstrated. As regards the future, I can only express my deep regret that, as a company, we must be dissolved; still I look forward not without hope that, associated with the Chartered Company, a course of prosperity will yet attend us. There is one thing we should not lose sight of, and that is, that the result of the amalgamation must be a material reduction of expenditure, and you know that as the expenses of conducting the business are reduced, the profits arising from the working will be proportionately increased. I should not be justified in saying to you, at the present moment, that we may expect to receive the same rate of dividend for a short time; but I have no doubt we shall ultimately receive the full share of return to which we are entitled. It is very gratifying to me to be able to say that your directors enter upon their new office with the sincere desire to act in concert with our friends on the board of the Chartered Company, and that we hope and believe our united efforts will tend to the permanent prosperity of the amalgamated undertakings. It has been my happy lot to preside over this company for fully 20 years as your chairman, and I have been connected with the direction of the company for nearly 40 years, during which time I have witnessed its progress with great satisfaction. We, as your directors, have done all in our power to merit your confidence and the confidence of the public; we have always enjoyed the former, and we believe that we have arrived at that period when we have attained the latter. Of course, under all circumstances, and in connexion with every undertaking, there will be found some dissatisfied people, however strenuously the directors may labour to remove all cause for discontent; but it is a great consolation to us, in the discharge of our duty, to know that while we have faithfully fulfilled every obligation to those who placed us in a position of responsibility, we have not been unmindful or neglectful of the interests of the public. I have already stated to you that in prospect of our amalgamation the directors of the Chartered Company offered to me the chairmanship of the united company. I declined the honour thus conferred upon me, and I felt fully justified in doing so; for unless I were fully adequate to the discharge of the duties of the office, I should have been doing an injustice to them and to myself. I only mention the matter now as a proof that we enter upon our duties in the united company in the kindest and most genial spirit one towards the other. The accounts for the half year, which are now laid before you, are certainly very gratifying to us, and I think they must be equally so to you; and we have no doubt that the dividend we are able to recommend will be approved and adopted by the meeting. Referring again to the amalgamation, I may say that for myself I should have been very much pleased if the City Gas Company could have remained a separate company. But a necessity for the step we are taking was forced upon us. The circumstances were irresistible; for, on the one hand, with an increasing business we find ourselves very much in need of room to extend our works, and on the other hand we had the Government against us threatening that if we did not come to some terms they would give the corporation power to erect works for the supply of the City. You may easily suppose what effect these considerations had with us, and how we were led, though reluctantly, to take a step, which, being taken, will, I have no doubt whatever, tend very much to the advantage of the company. Gentlemen, I have not much more to say to you. I hope we shall still continue to enjoy your confidence; I have already said that the accounts for the last half year are very satisfactory. There is an increase in the rental for the six months, as compared with the corresponding period of last year, of £5174 6s. 9d. This enables us to give you a dividend which I am sure will be gratifying to you all. It is especially to your directors a source of gratification to know that up to the period when their labours cease, they are in a position to recommend as high a rate of dividend as the law allows, and as you could reasonably expect. For myself, as this is probably the last speech I shall make as your chairman, I desire to express the deep obligations I am placed under to the friends by whom I am surrounded, for the great confidence which they have placed in me for so long a period of time. I hope I may be able still to serve them; and I can assure them, that in whatever way I can promote their interests in connexion with the company, I shall gladly devote my energies to the task, and that whenever I find, from age or infirmity, that I can no longer efficiently discharge my duties, I shall retire in favour of some one else. I thank you most sincerely for the undeviating kindness which I have always received at your hands. We have been in evil condition in past times, and we have also seen some prosperous days; but it is a satisfaction to me to reflect that even when we could only pay you a very bad dividend, you never gave utterance to the slightest expression of dissatisfaction at the conduct of the directors; and I believe throughout all our history you have felt convinced that, whatever the success of our undertaking, we had endeavoured honourably and to the best of our ability to perform our duty and to protect your property. You know we cannot control events. We have had great difficulties sometimes to encounter; we have been persecuted and prosecuted, but those who have preferred charges against us cannot compliment themselves on having established a single complaint, or on having justified their proceedings in the eyes of the public. Gentlemen, again I thank you for your kindness and courtesy to me at all times. I hope I shall have many opportunities of meeting you, not in this room, perhaps, but in some other; and I trust that the same spirit of concord and goodwill which has hitherto characterized all the proceedings of the shareholders of the City Gas Company, will distinguish the proceedings of the proprietors in the united undertakings, and that we shall realize a prosperous future. I beg now to move—"That the half-yearly report and accounts now read be received and adopted."

The DEPUTY-CHAIRMAN (Mr. Hadland): I have much pleasure in seconding the resolution.

Mr. JURY: Can you give us briefly the nature of the modification in the scheme which has been accepted by the Board of Trade?

The CHAIRMAN: I had intended to do so. Our solicitor, Mr. Layton, will read the resolution which was adopted by us at our special meeting, with the proviso inserted by the board.

Mr. LAYTON: The clause, as originally proposed, was as follows:—"Resolved, that an amalgamation of the City of London Gaslight and Coke Company with the Gaslight and Coke Company be approved, and that the scheme of amalgamation as now printed be approved, confirmed, and adopted, subject to the insertion therein of the following clause, viz.:—'Nothing herein contained shall alter or affect, or be held or construed to alter or affect, any or either of the provisions with reference to the City of London Gaslight and Coke Company, and their undertaking, which are contained in the Thames Embankment Act, 1862; the Metropolitan District Railway Act, 1864; and the Metropolitan District Railway Act, 1868, or either of them; nor shall anything herein contained take away, lessen, interfere with, or prejudicially affect any of the rights, remedies, powers, claims, and demands which by the said Acts, or either of them, were vested in or acquired by the City of London Gaslight and Coke Company.'" In lieu of this proviso the following is now proposed:—"Provided always, that nothing in this scheme shall be deemed to prejudice, diminish, or affect the rights, if any, of the City of London Gaslight and Coke Company, or the united company, to compensation for injury done to the property of the City of London Gaslight and Coke Company at Blackfriars, and for the interference with the carrying on of the business of that company."

Mr. JURY: Allow me to ask this question—In the event of any compensation being awarded, will the amount merge into the general funds of the united companies, or will the City Company retain it?

Mr. WARD: It will go into the general funds. We become part owners of the Chartered Company's property, and they of ours.

Mr. HADLAND: By the scheme it is provided that it is to go in reduction of the capital.

The CHAIRMAN: By reducing the capital, the amount upon which dividends are payable will be less. I ought to have called your attention to this, because we had great difficulty in the matter. The Metropolitan Board of Works and the Metropolitan District Railway Company opposed the clause very strenuously, but we contended that it was only fair and just, and we declared that we would not go on with the scheme at all unless it were adopted. After a great deal of negotiation the Board of Trade have yielded the point, and I think the business is now in a fair way of being arranged. I consider it was a gross injustice that those who were parties to the Act by which compensation was awarded for the injury we sustained, through the carrying out of a great public work, should endeavour to shuffle out of it. They were most strenuous in their efforts to defeat us, and I dare say the Board of Trade would have given in to them, but that we said under no possible circumstances could the amalgamation go on unless our parliamentary rights were recognized and secured. It was on the faith of receiving compensation for any injury we might sustain that we consented to the construction of a solid embankment in front of our works, instead of the arches which were to give us the necessary accommodation for our barges, and we felt

bound to stand up for the faithful carrying out of the engagement. There will be a special meeting of the proprietors in a short time formally to confirm the scheme, and then I trust everything will be straightforward.

The motion was then put, and carried unanimously.

Mr. WALMISLEY: Having been for considerably more than a quarter of a century connected with the company, it is no small gratification to me to have to submit to the meeting, on this occasion, the resolution which has been placed in my hands. I congratulate the proprietors on the very favourable report which has been laid before us, and I am sure they will all feel with me that, after so many years of litigation and conflict, it is satisfactory to close the transactions of the company with the conviction of having done our duty towards the public in the most complete and honourable manner. I beg to move—"That, agreeably to the recommendation contained in this day's report of the board of directors, a dividend out of the profits of the concern, for the half year ending the 31st of December last, be now declared as follows:—On the A, and on the amount called up on the new shares, at the rate of 10 per cent. per annum, and on the B shares at the rate of 4 per cent. per annum; the whole to be paid, free of income-tax, at the company's office, on the first Tuesday in April next, and on each succeeding Friday and Tuesday, between the hours of twelve and one o'clock."

Mr. WEST seconded the resolution.

The motion was put, and carried unanimously.

Mr. LEWIS: It is now my happiness to move—"That the best thanks of the shareholders are due, and are hereby presented, to the chairman, deputy-chairman, and directors, for their unabated attention to promote the interests of the company." This is a motion which I am sure requires very few words from me, for I suppose there is scarcely a gentleman in this room who is not acquainted with the course of events in connexion with the company, and the efforts which have been uniformly made by the chairman and directors to protect our interests and increase our prosperity. I will not trespass upon your time, nor assume on your part so much ignorance of the proceedings of the board as to suppose that you require to be told of their exertions to justify the passing of this resolution. But I have just one word to say upon a matter which is not on my paper. I heard with great satisfaction, when the secretary read the report, that after giving the proprietors a dividend at the rate of 10 per cent., there remained a balance of profit on the half year of £1100 at the disposal of the company, which I suppose the directors consider they have no power to interfere with. Now, I should like to suggest that, subject to the acquiescence of the meeting, £1000 out of that surplus be placed at the disposal of the directors for their own use. We all know what energy and devotion they have brought to bear upon the affairs of the company for many years past—how zealously they have laboured to promote our interests, and have safely guided us, sometimes through very anxious and perilous times, to our present state of prosperity. We all feel, I am sure, that they have done their work well, and that they deserve some reward. If you will permit me, therefore, I will move that out of the balance of revenue in hand the sum of £1000 be placed at the disposal of the directors.

Mr. LAVANCHY: I trust I may be allowed to second this resolution, being an old shareholder, and one who has watched the conduct of our excellent directors for many years past. We are deeply indebted to them for the large reward we get to-day in the shape of our final dividend. It is finishing up the operations of the company with something like glory, and we cannot but feel that to the untiring exertions and prudent over-sight of the directors we owe, to a great extent, so satisfactory a result. As regards the addition to the resolution proposed by the worthy proprietor, I do not know that we could dispose of this sum of £1000 in a more graceful way, and I trust the directors will accept it as some small token of our appreciation of their long and arduous services.

Mr. WALMISLEY: Before the motion is put I should like to ask one question. I am always very favourable to the directors receiving a proper remuneration, but we must recollect our directors do not go out of office; they will still continue members of the board. The question I want to ask is this: If £1000 is thus appropriated, does it leave only £100 in hand for the purpose of remunerating the officers of the company?

Mr. MILLAR: Allow me to say, on the part of the officers, that the directors have most liberally and handsomely recognized their services.

The CHAIRMAN: Gentlemen, you will, I am sure, consider that the directors feel deeply indebted to the honourable proprietor who has proposed that you should make such a liberal grant to them out of the sum which remains undivided. But we find ourselves in such a position that we could not with propriety accept the offer; in fact, I believe there would be legal objections to it, and therefore we would rather not take a vote on the subject. I must say, for myself and my colleagues, that you could not better have shown your respect for us, or a greater appreciation of our services, than by entertaining the proposition of my worthy friend, and if we could with propriety accept it we should be gratified in doing so. We think that we could not do so, but we none the less feel grateful to you for the consideration by which the proposal was suggested. Reference has been made to the officers, and I may state that we, as directors, felt we should not be doing justice to them, nor justice to our own feelings, if we allowed the company to be dissolved without marking the esteem and personal regard we have for them, and without that recognition of their services to which they are so deservedly entitled. Many of them have served us with great zeal and fidelity for a long period of time. What may happen hereafter I cannot tell, but one thing I may say, that I shall always cherish the highest feeling of respect for our officers, and of admiration for the manner in which they have, one and all, striven to advance the interests of the company in their respective spheres of action. They have served us faithfully and well, and they have given the greatest satisfaction, by their conduct, to the public at large. I am sure, therefore, you will concur in the propriety of the step we took with regard to them, as mentioned in the report.

Mr. WARD: Perhaps I may be allowed to say that, though it may seem to be assuming a virtue which we have not, when we decline to accept so kind and gratifying a proof of your respect and esteem, the fact is that after our accounts have once received the certificate of the official auditor, the scheme of amalgamation provides that the balance remaining on revenue account, when all the claims on that account, including the dividends due to the shareholders, are discharged, shall be carried to the credit of the revenue account of the united company, so that practically there is no surplus to divide.

Mr. LEWIS: May I ask whether counsel's opinion has been taken on the point?

The CHAIRMAN: No; we did not anticipate that such a proposal as this would be made.

Mr. LEWIS: I should like to ask the solicitor for his opinion.

Mr. LAYTON: I think the balance, after the public auditor has vouched the accounts, must go to the revenue of the united company.

Mr. LEWIS: I can only say I am very sorry we have no control over it.

The vote of thanks was then put, and carried unanimously.

Mr. LEWIS: I regret that we are not able to give expression to those thanks in a more substantial manner. Sheridan speaks of gratitude as being a lively sense of favours to come. I certainly repudiate that interpretation of the word on this occasion, and feel that the proposal I made was but a fitting expression of our obligation for services already rendered.

The CHAIRMAN: Gentlemen, I feel that it is my duty to say something to you after the passing of this resolution, because I may not have another opportunity of addressing the shareholders of this company. For myself, then, I would say that I am deeply indebted to you for the kindness you have shown me, not only on this occasion, but for many years past. I shall carry with me into my retirement, when the duties of my office are fulfilled, a very deep and abiding sense of the obligations under which you have laid me, and of the sincerest personal respect for every proprietor of the company. In the management of a large concern like this, it is always a satisfaction to the directors to hear from their constituents such an expression of their approval as that with which you have rewarded our exertions, and at the close of our labours we are peculiarly sensible of your kindness in this respect.

Mr. HADLAND: Gentlemen, I beg to express my concurrence in the remarks which have fallen from our chairman, and to thank you for this renewed mark of your kindness and confidence. I have been connected officially with the company since the year 1825, either as an auditor or a director, and I am pleased to know that on so many occasions my conduct has been marked by expressions of your approval.

Mr. WARD: Gentlemen, I am very much obliged for the kind manner in which you have passed this vote of thanks, and for the assurance you thereby convey of your continued confidence in your directors. I must say I really do think the accounts for the last half year are more than usually favourable, though not more so than they ought to be. I hope they may be taken as an earnest of the future, and that we may be permitted to see many years of prosperity and success.

Mr. PRIOR: Gentlemen, I can only echo the words of our worthy chairman in returning you my thanks. I trust we shall be spared for many years to come to see our affairs conducted in the same pleasant way they have hitherto been.

Mr. PEILL: I appreciate the honour you have done to me and my colleagues, and I can assure you that in the future nothing will give me greater pleasure than to recognize among our constituents those whose faces we have been accustomed to welcome at these meetings. Your old directors will always be glad to render you all the information in their power, and will be always assiduous in their endeavours to promote your interests.

Mr. FENN proposed, and Mr. WEST seconded, a vote of thanks to the auditors for their services in the past six months.

The resolution was put, and carried unanimously.

Mr. J. T. HADLAND and Mr. FORTESCUE, the auditors, acknowledged the vote.

The CHAIRMAN: At the special meeting held at the end of December I proposed a resolution making provision for our worthy friend, the secretary, than whom no man more richly deserves a reward. During the whole time he has been in the service of the company he has faithfully discharged his duty, and as this will be our last meeting as a body of proprietors, I should be unwilling to allow the opportunity to pass without giving you the satisfaction of expressing your high opinion of the services which Mr. Millar has rendered. The reward he has received at your hands is only commensurate with his deserts, and I ask you now to join in a vote of thanks to him, adding to it the hope that, when we can dispense with him and his services, he may enjoy, in the retirement of private life, the happy consciousness of having faithfully discharged his duty, and earned the approval of all with whom it has been his lot to mingle.

Mr. LEWIS: I shall be happy to second the resolution, and perhaps we may include in the vote "the other officers of the company."

The CHAIRMAN: We entertain a very high opinion of the other officers, but they are still in the service of the company, and therefore their position is somewhat different to that of Mr. Millar. But it is only right I should say that we have most efficient officers in every department of our operations, and that it is to that efficiency we are so largely indebted for the prosperous condition of the company. I hope we may have the benefit of their services in the new company.

Mr. HADLAND: I have great pleasure in supporting the resolution.

The vote having been most cordially adopted,

Mr. MILLAR said: Mr. Chairman and Gentlemen, if anything could have added to the deep sense of obligation under which I am laid for the handsome remuneration voted to me at the last meeting, it is the very kind manner in which I have been referred to by the chairman on this occasion. I call to rememberance that this is the hundredth half-yearly meeting which has been held since I became connected with you, and I think the proprietors will sympathize with me when I say that he must be more or less than mortal who could receive such an expression of their kindly feeling and approbation, at this the last meeting of the company, without the most profound emotions of gratitude. I have worked for the company very pleasantly for a great many years, and indeed it would have been monstrous if I had not, for no secretary could have received more courtesy and kindly consideration than I have done since I held office in the company. Again thanking you, gentlemen, for this vote, I will only add, in the words of the report, that I trust the amalgamated companies will go on prosperously, and that the same feeling of harmony and goodwill which has always characterized our proceedings in the past may prevail for the future.

The CHAIRMAN: Perhaps it would not be out of place for me to read the letter which we received from the Government on the subject of the clause proposed by us:—

Board of Trade, Railway Department,
London, S.W., Jan. 21, 1870.

Gentlemen,—In further reference to your letter of the 24th ult., I am directed by the Board of Trade to inform you that, having considered the objections of the Metropolitan Board of Works and the Metropolitan District Railway Company to the clause proposed by the gas companies, they are of opinion that justice will be done to all parties by the adoption of the clause, with the addition of the words "if any" after the word "right," and they have settled it accordingly.

A copy of the clause, with the amendment, is enclosed, and it is presumed that the companies will have no objection to accepting it in the present form.

I am, gentlemen,
Your most obedient servant,
R. G. W. HERBERT.

Messrs. Wyatt and Hoskins, 28, Parliament Street.

Mr. JURY: We are amalgamating with another company whose works are situated remotely from the district where the gas is supplied. Perhaps I may be ignorant in asking the question, but I should like to be informed whether those works are so constructed that the gas can be supplied in the City without a large per centage of leakage.

The CHAIRMAN: I believe among practical men there has been a diversity of opinion on the subject; but the conclusion they have arrived at is that, in consequence of the size of the mains, there will be very little leakage.

Mr. JURY: I do not know whether there is any instance in which gas is practically supplied at such a distance from the place of manufacture.

Mr. MILLAR: Yes, there is the case of West Bromwich, where gas is supplied from Birmingham, a distance of seven or eight miles.

The CHAIRMAN: We have ourselves about 150 miles of pipes, and we shall continue to supply gas from our own works till those at Beckton are completed.

Mr. JURY: In the event of the works at Beckton proving adequate for the supply, are the other works to be disposed of?

The CHAIRMAN: Yes. When the Chartered Company obtained their Act, it was stipulated that the Curtain Road and Brick Lane stations should be done away. The Horseferry Road station will be retained.

A PROPRIETOR: At the last meeting I think there was an understanding that a copy of the scheme should be sent to each of the proprietors.

Mr. MILLAR: If this clause is accepted, a copy will be sent round.

On the motion of Mr. SMITH, it was resolved—"That the cordial thanks of the meeting be presented to the chairman for the courtesy and ability he has displayed on this occasion."

The CHAIRMAN: I am very much obliged to the honourable proprietor who has proposed a separate vote of thanks to me, although I feel that I should never have been able to perform my duty without the co-operation of the friends by whom I am surrounded. I have always been desirous to give every information to the proprietors, and so to conduct the affairs of the company as to give satisfaction to them and to the public at large. I have been willing to make concessions whenever I thought they could be beneficially adopted, but I never would give way to clamour. The state of the company would have been very different if I had vacillated at all. We have been subject to very much annoyance and difficulty, but by the exhibition of a firm yet conciliatory spirit, and by being enabled to show that right was on our side, we have reinstated ourselves in the opinions of our friends.

The proceedings then terminated.

CHARTERED GASLIGHT AND COKE COMPANY.

An Extraordinary General Meeting of the Shareholders of this Company was held at the Works, Horseferry Road, on Friday, Feb. 4—S. A. BECK, Esq., the governor, presiding—to consider the provisions of a bill introduced by the directors into Parliament, "to enable the Gaslight and Coke Company to purchase the undertaking of the Victoria Docks Gas Company, and for other purposes."

The SECRETARY (Mr. J. O. Phillips) having read the notice convening the meeting,

The GOVERNOR referred to the map on the wall as indicating the districts of the two companies.

The SECRETARY then read the heads of the bill, an abstract of which has already been given in the JOURNAL.

The GOVERNOR moved—"That the bill now read to the meeting be approved." In doing so, he briefly alluded to the desirableness of adding to the company's area of supply the district of the Victoria Docks Company, which immediately adjoins the new works at Beckton. The vendors asked £75,000 for their undertaking, and this company offered at first £60,000, and subsequently £67,500, and the terms ultimately agreed upon were £70,000. The Victoria Docks Company had been paying 6 per cent. upon their capital, and really could have paid 6¾ per cent. He had no doubt that, with the facilities of this company, 7 or 8 per cent. might be realized upon it, and ultimately they would be able to sell the works, and the freehold land upon which they were built adjoining the river, and so recoup themselves a considerable portion of the purchase-money. The district was at present somewhat sparsely populated, but in course of time it would become covered with manufactories in which there would be a large demand for gas. Unless they acquired these works, and the rights belonging to them, the Chartered Company could not supply the houses of their own workmen with gas, as the whole were in the district of the Victoria Docks Company. They had had the works carefully examined by their own engineer, who reported that it would have answered their purpose to give £75,000 for the property.

The Hon. HOWE BROWNE (deputy-governor) seconded the motion. He said the subject had had the best consideration of the court of directors, who, in the first instance, delegated the matter to two or three of their number to look most minutely into the whole question. The result was to convince them that the purchase would in the end be highly beneficial to the Chartered Company. The land upon which the Victoria Docks works was situated was very valuable land, and within a very recent time a portion was sold at the rate of £1000 per acre.

The GOVERNOR, in answer to Mr. Woollaston, said the capital of the Victoria Docks Company was £50,000, and their present rental about £10,000 a year. The price at which gas was supplied varied from 5s. with a discount, down to 3s. 6d., the average being 4s. 6d. The illuminating power under their Act was 12 candles. This company sought, by the present bill, to get a transfer of their powers.

Mr. WOOLLASTON said the reference to 12-candle gas reminded him to ask a question. He had seen certain statements in the papers lately to the effect that this company were charged with supplying gas of a deficient illuminating power. He trusted that there would be no such complaint in future.

The GOVERNOR said he hoped not. The honourable proprietor was, perhaps, aware that the company had appealed from the magisterial decision alluded to, and he might add that since the appeal every one of the testing-places in the City had been suspended by the official referees, owing to the fact that the whole of the machinery, from the clock to the cubic foot measure, was in an unsatisfactory state.

Mr. WOOLLASTON said he asked the question in the hope that he should get such an answer.

The GOVERNOR: It shows the injustice of the conviction.

Mr. LAVANCHY asked whether an opportunity had been given to the directors of the City of London Gas Company to consider the provisions of this bill.

Mr. GRAY said he would answer the question very readily. The directors of the City Company had given the matter their serious consideration, and had come to the conclusion that it might be injurious to the best interests of the amalgamating companies to have a rival company in the immediate vicinity of their works. They therefore considered that the directors of the Chartered Company were exercising a wise discretion in becoming purchasers of the concern.

Mr. WOOLLASTON inquired when the purchase-money was to be paid.

The GOVERNOR said this time twelve months hence. Then the Chartered Company would be in full working order at Beckton,

Mr. WOOLLASTON asked whether the Saville House fire was settled for.

The GOVERNOR replied that it was. In answer to a further question, he stated that the net profits of the Victoria Docks Company were £3300, which paid 6 per cent. upon their capital; but, as he had stated, the engineer of their company thought it could be considerably increased by the improved working.

The resolution was then put, and carried unanimously.

The usual vote of thanks to the chairman terminated the proceedings.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

An Extraordinary General Meeting of the Proprietors of this Association was held at the City Terminus Hotel, Cannon Street, London, on Tuesday, Feb. 1, in accordance with the Standing Orders of Parliament, for the purpose of considering the provisions of a bill introduced by the directors into the present session of Parliament for granting further powers to the association—P. TWELLS, Esq., in the chair.

The SECRETARY (Mr. Albert F. Jackson) having read the notice convening the meeting,

Mr. PHILLIPS (the solicitor to the association) read the heads of the various clauses of the bill, an abstract of which has already appeared in the JOURNAL.

The CHAIRMAN: Gentlemen, this is the proposed Act of Parliament which, in accordance with the pledge given by the directors at recent meetings of the shareholders, we have thought it our duty to lay before you, so as to give you the opportunity of accepting or rejecting it, as you in your judgment may consider most desirable for the interests of all parties concerned in the capital of this important association. With regard to the feelings of the directors themselves, we are, I am sorry to say, not quite, though almost, unanimous in recommending the shareholders to accept it. At the same time, in doing so, we must remind them that the acceptance of the bill as it now is will not in any way increase the facilities of the association for extending its profits or of adding to its business. Its object is really and simply a more judicious and a more truthful mode, as we consider it, of distributing the capital which is invested in our works, by increasing the number of shares, so as to represent more adequately the amount of money expended at the different stations, and in the plant and property of the association generally. It arose chiefly, I believe, from the existence of that very large sum standing to the credit of one of the accounts in our books, called "the reserve-fund." When we find to the credit of any fund a sum of £1,300,000, we cannot wonder that shareholders, particularly those who have joined the concern recently, should consider it a fund which is capable of being divided as cash among the members of the association. Of course those who have held shares for any length of time know that the whole of this money has been expended in our works, and is no more capable of division than the money expended in the making of a tunnel, or the construction of a railway, or the digging of a canal. It is not like the capital of a joint-stock bank, which has always to be represented by money, and where, if the proprietors choose to say, "We will dissolve the company and divide the capital," every penny must be represented in cash capable of being returned. In our case the whole of the money has been expended, and therefore there is nothing in the shape of cash which can be divided and handed over to the shareholders. At the same time it is very adequately represented by the stations, retorts, gasholders, mains, and other property belonging to the association, producing an income fairly and fully remunerative, not in proportion merely to the capital actually subscribed by the shareholders, but of the capital expended, which consists of the capital subscribed and the capital created year by year out of the profits of the concern. Under these circumstances we cannot wonder that many shareholders should say: "As we cannot have the money repaid to us, let us have something to represent it; let us have shares which shall stand in the place of the money so expended." A recommendation to adopt the same plan has also come to us from the Continent. There it is said: "It appears to be represented by the company that the capital consists of £1,225,000, and as it is known you are dividing at the rate of £220,000 a year among the proprietors, it does seem as though the profits of the concern were exorbitantly large. Therefore, when a concession is on the point of expiring, it is not unreasonable for the municipal authorities of the district to say, 'If you can divide so large a sum of money on comparatively so small a capital, it is clear you must be charging us for gas more than is necessary.' Whereas the capital required to produce the quantity of gas supplied by the association is just double what is represented by the amount paid upon the shares, and if the capital is taken, not at £1,225,000, but at £2,500,000, and 10 per cent. divided upon it, you ought, instead of having £220,000, to have £250,000 a year. That is the rate of dividend which in England is not considered an unreasonable thing, and therefore on the Continent a dividend of 10 per cent. is not greater than the municipal authorities and the consumers are willing to concede to you." Now, all these circumstances point to the capitalization of this large reserve-fund, and as it has been frequently urged upon the board, they have had the bill prepared which has been submitted for your consideration to-day. In making this capitalization, it has been a matter of grave consideration with the directors to what extent they should go. There are many shareholders who have one share only, and it would evidently be a very convenient mode of doing it if we could give share for share, so that no one would be omitted, no one have a fraction of a share, no one be wronged. This, however, required us to exactly double our capital, and to write off from our reserve-fund an equal amount to that called up on the shares—viz., £1,225,000. As far as the board are concerned, though it is a matter of indifference to them, they recommend that you should keep the shares at the same amount they now are. Taking the sum appropriated to meet contingencies, improvements, &c., at £1,300,000, this would still leave a margin of £75,000. Gas companies in England are allowed by Parliament to receive 10 per cent. before they are required, for the benefit of the consumers, to reduce the price of gas. I have requested our cashier to make me a calculation of the amount of dividends paid by this association during the last 30 or 40 years, and I find that if we had divided 10 per cent. upon our capital we should have received nearly £750,000 more than has actually been paid to us in the form of dividends. Our foreign consumers have, therefore, abundant reason to commend our liberality. In the next place, the present generation of shareholders have good reason to commend the self-denial and prudence of former generations, who were satisfied with much smaller dividends than the profits would have warranted, and which, without any great impropriety, they might certainly have declared. It is to that self-denial on the part of former shareholders that we are indebted for our very large reserve-fund. Now, if you take the £750,000 and add interest to it, beginning with, say 40 years ago, the amount now would not be less than the whole £1,225,000 which we now propose to capitalize. I think, therefore, that we are fully entitled to avail ourselves of the accumulation formed by the economy of former years. This, I believe, is quite in accordance with the feeling of most of the shareholders who have been good enough to communicate their views to myself personally. It is also in accordance with the views of the majority of my colleagues at the board. But while they approve the prudence of past generations, and are quite willing to receive an apportionment of a larger amount of capital, it happens rather strangely that some of those gentlemen to whose exertions and self-denial we are so much indebted for this reserve-fund, are almost the only parties who are not willing to receive their share of the advantage. Our excellent colleague, Mr. Attwood, who has laboured more than any one at the board to raise the reserve-fund, to whose exertions we are all, as shareholders, infinitely indebted, not only is not anxious to receive his share of this new capital, but will not accept it unless this meeting actually forces it upon him. We recollect how recently the shares of the association were at £95. Now, if you look in the papers, you will find they are at £135, and yet I fear that Mr. Attwood honestly and sincerely believes that his very large property at stake in this association is more insecure and less valuable now than it was twelve months ago, when we were paying a much smaller dividend, and our shares were at a much lower price. But the policy which the directors have for the last twelve months been pursuing, and which I hope they will continue to pursue, is exactly that which Mr. Attwood has recommended and urged upon us for the last 20 years. The policy is to keep all our stations in good working condition, and we find by that most invaluable of all instructors, experience, that the efficient state of our stations and plant, and of the things which require the outlay of money, cannot be satisfactorily maintained without an expenditure of about £70,000 per annum. That £70,000 has, for the last ten years, been expended out of the reserved profits of the association, and expended in such a manner as to strengthen and benefit us in every way. The wise policy which the directors have always adopted is to deduct that sum from the profits before proceeding to make a dividend. After that, the sum which remains they considered might most fairly be divided among the shareholders. This they have done, and, while taking care to preserve the efficiency of the works, the profits of the association have increased to such an extent that in 1869 the dividends were double what they were in 1859. Now, this policy I hope the directors and shareholders in this association will always observe; but there is nothing stereotyped, nothing intrinsically meritorious in the amount or in the dividend of £3 or £4 per share, or in any other sum you please to name. The great object is to preserve the works in proper order, and for that purpose to apply an adequate sum every year out of the profits of the undertaking. When we have applied that, in accordance with the policy of our predecessors in office, if by any chance our profits should be double what they are now, I know of no reason why you should not divide the additional profits in the shape of an increased dividend. If, on the other hand, our profits should

fall so low that the present dividend could not be maintained without impinging on the sum necessary for maintenance, I for one would be most willing to suffer loss by the diminution of dividend rather than allow the works to fall into disorder from such a cause. These are all the observations I have to offer, but before I sit down I would refer to a letter which I have received from our esteemed president, Sir Moses Montefiore. He says: "It is, I assure you, with great regret I find myself too unwell to leave home, and therefore I shall not have the pleasure of attending, to-morrow afternoon, the general meeting of the shareholders of the Imperial Continental Gas Association. I have every confidence that great unanimity will prevail at the meeting. May I ask of you the favour to apologize for my absence to our esteemed shareholders and my colleagues at the board?" I heartily concur in the hope that if our proceedings are not perfectly unanimous, they will, at all events, be nearly so; and if it should be the opinion of the shareholders generally that the policy recommended by our friend, Mr. Attwood, would be more prudent and wiser than that which the board generally have recommended for their adoption, I most sincerely hope you will accept it. If, on the other hand, you adopt the policy which the majority of the board feel justified in recommending, I am sure no one more than Mr. Attwood will be pleased that his fears and apprehensions turn out to be groundless, and that your property and his suffer no depreciation. I beg to move—"That this meeting approve of the Imperial Continental Gas Association's bill now before Parliament, subject to any alterations which, with the concurrence of the directors, may be made in the bill in its progress through Parliament."

Mr. TURNER seconded the motion.

Mr. ATTWOOD: I feel it my duty to oppose this measure. There is no man who has been longer connected with or more deeply concerned for the prosperity of this association than I have been, and no one has devoted more time, perseverance, and energy than myself to carry it on, and to bring it to the degree of prosperity which we now experience. The great objection I take to the bill is that to divide the capital is mere moonshine. There is no such fund as the reserve-fund—the money is totally gone. There are two stations—Toulouse and Marseilles—on which we have expended £100,000, and what is the state of them? We have lost the concessions, our property is rotting in the ground, and we are turned out of the towns. I have often explained to the shareholders that we are not like a gas company in London. Here the companies get an Act of Parliament, and no one can interfere with them. It is not so in our case; we are merely leaseholders, if I may use the expression. But if we maintain our works in an efficient state, which will enable us to carry out our contracts satisfactorily, we shall be able to supply gas on better terms than any one else could do, so that we shall be able to hold our own in spite of any desire to get rid of us. I could point out an instance where, lately, one of our contracts expired. There arose a desire among the Town Council to make their own gas, and we were at the same time anxious for a renewal. We told them that we could supply them better than they could supply themselves, and they said at last, "If you will make a contract on our terms, we will give you the concession." Their idea was to have bought up our works, to borrow money for the purpose, and to pay interest upon it. But when they came to consider the amount of money they would have to borrow, and also the terms we offered, they found that they could not make more than 2 or 3 per cent. interest on the capital, and that it would pay them much better to give us the contract. Having nursed the association up for 45 years, it is a disagreeable thing to me to see it tumble down and go to the dogs. Therefore I shall oppose the bill, and move, as an amendment, that the bill be not adopted. I shall go to the shareholders on that question, and upon that question I shall take the sense of the meeting. There is one other point I should like to mention. A notice has been given to the shareholders that proxies can be made use of in deciding this matter. Now, I protest against such a proceeding. By our Act of Parliament no shareholder can vote by proxy—it is totally illegal, and contrary to the Act. By clause 36 of the Companies Clauses Act, which is incorporated in our Act, it is forbidden, and therefore all such proxies will be void. I now move—"That the bill be not adopted."

Mr. BROWN seconded the amendment.

Mr. WARD JACKSON, referring to the observations of Mr. Attwood as to the renewals of contracts, expressed a hope that, with the improved financial resources of continental cities, better terms might now be obtained by the association than formerly.

Mr. CATOR did not think the objections taken by Mr. Attwood to the scheme were sustained by the circumstances of the case. He admired that gentleman for all that he had done in past times for the association, but he could not at all see the force of the reasoning by which he now supported his objections to the bill. Surely, after having for so many years expended large sums of money out of profits in the maintenance of their property, the shareholders were entitled to see those sums represented at their full value. He believed the association had well fulfilled the obligations of the various contracts which had been entered into for lighting the towns in which their stations were, and therefore they had no reason to apprehend opposition when those contracts expired.

Mr. EVANS said the honourable shareholders who had spoken scarcely did justice to the mover of the amendment, who had himself given such proof of his sincerity and devotion to the interests of this association, that his remarks were entitled to the most respectful consideration. At the same time, he did not agree with Mr. Attwood in his objection, and for this simple reason—that all men, connected with business as he had been, must see that an error in book-keeping had been committed in this matter, rather than anything else. The money was laid out on the works and plant, and the capital of the association should have been *pro tanto* increased. They had no right to call it a reserve-fund. The pipes in the ground, the retorts and furnaces which this money purchased, were as much a part of the capital as the original £1,225,000. To call it anything else was wrong, and was only deceiving the public as well as the shareholders. When he first joined the company, and heard of this "reserve-fund," he imagined that they had this money put by instead of its being all laid out, and, as far as the power to divide it went, useless. The bill now before the meeting proposed to rectify this error in book-keeping, which ought to have been set right years ago. He thought the directors had done well in promoting the bill, and he hoped they would receive the support of the meeting.

After some observations by Messrs. Pridden, Stokes, Turner, and Edwards,

Mr. BASSETT said he thought the question really was—Supposing the valuable property of the association were put up for sale in the market, what would it fetch? Mr. Attwood must be perfectly well aware that it would fetch as much money as was now sought to be declared the capital of the association. He had attended a good many of these meetings, and had always found Mr. Attwood prophesying ruin. When the shares were at £65 they were all going to be ruined, and he (Mr. Bassett) was sorry to say he listened to the prediction, and got rid of some of his shares. When he came to the next meeting the shares were at £90, and Mr. Attwood again predicted ruin. He could now get £135 for his shares. Poor ruined man! Who would not like to share his ruin? He regarded the bill as embodying a very wise and safe policy, and he hoped Mr. Attwood would live many years to see that he had made one more mistake.

The CHAIRMAN replied to the various speakers. He said, with regard to the probability of obtaining renewals, it was impossible to speak confidently, or do more than give the result of their experience. Having been in existence 40 or 50 years as an association, there had been very few cases in which they had been turned out of a place. Therefore they might fairly hope, considering the terms they stood upon with the authorities, that there was as good a chance for them in the future as in the past. He was not aware that they were in a worse position, or on less friendly terms now with the authorities anywhere than they had always been since their establishment. A question was asked whether the value of the works was equal to the money expended upon them, consisting partly of the subscribed capital, and partly of reserved profits. All he could say was that he would be extremely sorry to sell them for anything like the amount which the directors proposed to take as the nominal capital of the association—viz., £2,450,000. He had no doubt that many gentlemen in the room knew something of the principle upon which gas-works in this country were valued. The income of the association had been stated at £330,000. That might be rather beyond the mark, but suppose it was taken at £300,000. Adopting the principle of valuation usually applied—17 years purchase—it gave £5,100,000 as the value; and that 17 years purchase did not include the stock, coal, or anything of that kind; it was merely the estimate of the stations and pipes. Therefore, when the directors proposed to raise the nominal capital of the association to £2,450,000 as representing property which, if it existed in this country, would produce about £6,000,000, they could not be accused of trying to place it beyond what might be considered to be its value. A question had been raised by Mr. Attwood with regard to the admission of proxies. He (the chairman) had to state that this was not a meeting under the Act of Parliament or the Deed of Settlement; in fact, they had nothing to do with either on this occasion. It was a meeting held to meet the exigencies of the new Standing Orders of the House of Commons, and those Standing Orders required that proxies should be used.

A PROPRIETOR appealed to Mr. Attwood to withdraw his amendment.

Mr. ATTWOOD declined to do so.

The amendment was then put and negatived, 13 hands only being held up in its favour.

The motion was put, and carried with few dissentients.

On the motion of Mr. BASSETT, a vote of thanks was given to the chairman, which having been acknowledged, the proceedings terminated.

CAMBRIDGE GAS COMPANY.

The Ordinary Half-Yearly Meeting of the Shareholders of the Cambridge University and Town Gaslight Company was held at the Office of the Company, Sidney Street, on the 27th ult.—Rev. Dr. PHELPS presiding.

The notice convening this meeting, and the minutes of the last meeting, were read and confirmed.

The following report of the directors, which had been printed and circulated, was taken as read:—

The directors herewith submit to the shareholders a statement of the accounts for the half year ending Christmas, 1869, which accounts have been duly audited.

The profit and loss account for the half year shows a balance of £2388 18s. 5d., which with the balance of £3641 7s. 11d. on the last half year's account shows a profit on the year's working of £5030 6s. 4d.

The directors recommend a dividend for the half year ending the 25th of December last, after the rate of £10 per cent. per annum on the consolidated stock, and after the rate of £7 per cent. per annum on the amount called up on the new shares.

The directors regret to have to report the destruction of the new large gasholder, which it will be remembered was erected in 1867 according to the plan and specifications of the late Mr. Methven, of the Imperial Gas-Works, at that time the engineer to this company. It was overturned in a heavy gale of wind on the 13th ult., and its contents, nearly 300,000 cubic feet of gas, on escaping into the air, accidentally became ignited, and were all consumed. The company's present engineer, Mr. Hawksley, was immediately summoned by telegraph, and in company with Mr. Balfour, the builder of the holder, made a careful examination of the wreck, and investigated, as far as it could be done, the causes which led to it. Mr. Hawksley has made an elaborate report on the subject, which, if the shareholders desire it, will be read at the meeting on the 27th inst. Here it is only necessary to say—and the directors have some satisfaction in being able to do so under the authority of so eminent an engineer as Mr. Hawksley—that, upon the whole, this calamity must be regarded as an accident, and cannot be justly ascribed to any blameable negligence in the officers at the works, or to any such palpable defect either in the plan or structure of the holder as would render the engineer or the builder in any degree responsible for the loss.

The directors are in consultation with Mr. Hawksley on the subject of the reconstruction, and are assured a new holder will be ready for use next autumn. As far as can yet be seen, there appears no reason to believe that the tank has suffered any serious injury.

It is some comfort to the directors that, thanks to the valuable guidance of Mr. Hawksley, and the careful and skilful management of the company's officers, the supply of gas, even at the time of greatest demand, has been uninterrupted.

Dr. CAPITAL ACCOUNT. *Cr.*

To Consolidated stock		£37,440	0 0	By Expenditure on capital account, to Midsummer, 1869	£55,729	4 5
New shares—first call of £2 per share on 1872 shares		3,744	0 0	Ditto since—		
Ditto second call on do.		3,744	0 0	Main-laying	89	1 9
Ditto third ditto of £1 per share		1,872	0 0	Sundries	95	14 1
Loan—					£55,914	0 3
H. R. Evans, Esq., on mortgage		5,000	0 0	Less amount received by sale of materials	250	0 0
Messrs. Foster's temporary advance		4,300	0 0		£55,664	0 3
				Balance	435	19 9
		£56,100	0 0		£56,100	0 0

Dr. PROFIT AND LOSS, *Half Year ending Christmas*, 1869. *Cr.*

To Manufacture—				By Sale of gas and meter rents	£7,405	11 8
Coal carbonized	£3,091	3 8		Less bad debts and allowances	41	7 11
Supervision and labour	920	1 11			£7,364	3 9
Trade accounts	963	9 7		Residual products—		
Distribution—				Sale of coke. £1,381 16 8		
Wages	382	14 4		Less bad debts and allowns. 44 13 2		
Trade accounts	691	15 4			1,337	3 6
Miscellaneous—				Sale of tar	156	0 0
Directors allowance	116	0 0		Ditto sulphate of ammonia	595	9 6
Salaries	209	0 0		Fit. profits. £463 12 10		
Collectors commission	67	9 6		Less bad debts and allowns. 32 16 2		
Auditors	7	7 0			430	16 8
Stationery and printing	47	3 1		Rent of cottages	7	10 2
Rent	40	0 0		Sundries	76	0 0
Rates and taxes	328	15 11				
Law charges	469	9 8				
Sundries	49	8 7				
Interest	194	6 7				
Balance (half year's profit)	2,388	18 5				
	£9,967	3 7			£9,967	3 7

The CHAIRMAN proposed that the above report be received and entered on the minutes. He did not think there was really anything to remark upon. They knew of the unfortunate circumstance connected with the gasholder. It was erected in 1867, according to plans and specifications given by their then engineer, Mr. Methven, now deceased, and its construction was carefully watched by his son, as clerk of the works, and they knew of the catastrophe that had taken place. He need not dilate upon it now. Any questions with regard to the foregoing reports he should be happy to answer.

Mr. S. PEED seconded the proposition.

In reply to questions from Mr. STEWARD, it was stated that the estimate for a new gasholder, according to a report which the chairman had received from Mr. Hawksley, was about £3000. The cost of the holder which had been destroyed was rather over that sum.

The CHAIRMAN read the report which had been alluded to, from Mr. Hawksley,

upon the cause of the accident, into which he had made minute inquiries. We can give but a meagre abstract of this report. All concurred that there was a heavy gale at the time, with violent intermittent gusts. These gusts caused the holder (which was full to the greatest height allowed within two feet) to oscillate, and at length the strain upon the columns became so great that six of them were fractured. This state of the frame left the rolling motion of the holder practically unchecked, and eventually the lower curb was actually rocked out of the water and landed upon the edge of the tank. This allowed the gas to escape to the extent described in the directors report. The holder assumed a figure almost impossible to describe. Mr. Hawksley attributed the primary cause of the accident to the then existing gale, and to the inability of the frame to resist the pressure brought against it; but there were no grounds for a preconceived opinion that this accident would occur, and he did not desire to impute to the engineer any deficiency of professional skill in the drawing, or inattention in the erection of the constructive parts. Mr. Hawksley strongly advised the company to construct a new holder with entirely new materials, which would cost about £3000. The restoration could be completed by October. The tank had not sustained any serious injury.

Mr. STEWARD disagreed with Mr. Hawksley upon the point in his report, which set forth that it was perfectly impossible in a system of mechanics to devise a plan to render such a peculiar structure secure against gales. Mr. Steward eventually inquired into the item of law expenses, and was informed that there remained still to be paid a sum approaching £500. He was glad to see the accounts put into a more concise form, and he hoped the improvement would go further in that direction.

A long discussion ensued upon the question of the holder, which, from pressure on our space, we are unable to give.

Mr. GOTOBED (who also believed in the inefficiency of the holder) spoke of the form which the abstract of accounts had assumed, and thought it should afford more information.

He was answered by the CHAIRMAN and Mr. S. PEED; the latter observing that it was impossible to devise a form of accounts which would please every one. The directors had kept rigidly to the Act of Parliament in the form they had adopted, and had been actuated by a desire to make them as simple as possible. If there was any difficulty the books could be referred to.

In reply to a question from Mr. Gotobed, the CHAIRMAN said the directors were of opinion that the expense of the new holder could be defrayed out of the floating assets.

The reports were received.

The CHAIRMAN proposed that a dividend for the half year ending the 25th of December last, after the rate of £10 per cent. per annum on the consolidated stock, and after the rate of £7 per cent. per annum on the amount called up on the new shares, be declared

This was seconded by Mr. E. WAYMAN, and carried unanimously.

Mr. STEWARD, considering the directors miserably remunerated for the superintendence of so large a concern, and finding he could legally move such a resolution at that meeting, proposed that the directors allowance be £300 per annum, to be divided amongst the board as they themselves deemed fit.

Mr. GOTOBED objected to the motion, on the ground that they ought to have time to consider the matter; and there was also a question as to its legality.

Mr. W. PEED said counsel's opinion had been taken with regard to the special section referred to by Mr. Gotobed, but not for this particular case, and it was legal to proceed with such a resolution.

The motion was put by Mr. STEWARD himself, and it was carried unanimously.

Mr. S. PEED then moved that the remuneration of the auditors—Messrs. J. Dennis and J. Hall—be increased from 14 to 20 guineas.

This was seconded by Mr. STEWARD, and carried.

A vote of thanks was passed to the chairman, on the motion of Mr. STEWARD, seconded by Mr. GOTOBED; in acknowledging which the CHAIRMAN assured them that the directors would do their utmost to keep the concern right and improve the state of the property. There was one matter still to which he had to allude. They were aware that by the lamented death of the late Mr. G. E. Foster the company had lost their much respected treasurer. The directors had lost no time in taking this important matter into their consideration, and had appointed the son of the late Mr. Foster as his successor. He hoped and believed this would be satisfactory to the shareholders.—*Cambridge Chronicle.*

THE CAMBRIDGE GAS AND WATER COMPANIES VALUATION AND THE ASSESSMENT COMMITTEE.

A Meeting of the Assessment Committee took place on Thursday, the 27th ult.—Mr. CHARLES WISBEY in the chair. The purport of the meeting was to receive the report of the chairman of this committee and the Board of Guardians, who were deputed conjointly to confer with the chairman of each of the above-named companies, with the view to an amicable arrangement. The gas company's valuation was first taken.

The CHAIRMAN said they had proceeded in such a way at the various conferences the various chairmen had had, as not to bind this committee to anything. The committee could adopt what course it pleased. At their first meeting, with the view of avoiding litigation (if at all possible), they came to this decision—that if they could not agree in the matter of the valuation, they would recommend that Mr. Bulwer, the borough recorder, should be asked to appoint some competent person to settle the amount, such decision to be binding on both parties. Mr. Leeds set his net rateable value for the gas company at £2538. The company admitted they had based their valuation wrongly, and eventually the assent of the company was obtained to abide by an assessment of £2200.

Mr. BOND (as chairman of the Board of Guardians) also addressed the meeting, giving an outline of the course the various chairmen had pursued at the conferences. He was satisfied that the sum which had been assented to was a fair and reasonable valuation. The question of the assessment of the fittings at the office of the company in Sidney Street, was doubtful in a legal point of view, and they acted on the advice of Mr. Lee to make a small concession rather than get into litigation. As an argument in support of their concession he referred to the case of the Phœnix Gas Company, which was assessed by Mr. Lee at £47,000, when the company wished to pay on a valuation of £15,000; the valuation was ultimately settled at £33,000.

The CHAIRMAN drew up and presented the following report:—

We, the undersigned, beg to report to the Assessment Committee that after various meetings with the chairman of the gas-works and the chairman of the water-works, they recommend to the Assessment Committee that the net rateable value of the gas-works in the town of Cambridge shall be at the sum of £2200; and also recommend to this and future Assessment Committees that this rating shall continue undisturbed for the term of five years; and we beg to state that the chairman of the gas company has agreed on the part of that company to accede to this recommendation.

(Signed) CHAS. WISBEY.
WILLIAM BOND.

Mr. RANCE moved, and Mr. MANN seconded, that the report be received and adopted.

Mr. LEONARD was opposed to the assessment, but would not vote against the motion, with the view of avoiding litigation. He thought the company would have been a little more generous.

Mr. RUTTER also spoke in opposition.

Mr. RANCE pointed out the great risk under which the company carried on its business, and did not see they would be wrong in adopting the recommendation.

Mr. HUNT considered the company were fighting for a shadow. He was opposed to the amount recommended, but (like Mr. Leonard) should not vote against the motion, because he disliked litigation.

Mr. MANN considered that an honest conclusion had been arrived at.

Mr. COOKE considered it was not a matter of generosity, but of justice. It must also be remembered that it was not the company who disturbed the old valuation. The matter had been thoroughly inquired into, and he agreed with the recommendation of the report.

Mr. BOND said they worked hard to maintain the old assessment, and drove the best bargain they could under the circumstances. They thought it best to make a slight concession rather than involve themselves in litigation. He thought the valuation fair.

Mr. FRENCH: That is all the ratepayers and the company require.

The report was eventually received and adopted by five to two. The assessment of this company will be something like £150 under the old valuation.

The valuation of the water-works was next taken, and the meeting were informed that the chairman had not been fortunate in arriving at a settlement of this question.

A long discussion took place, which was of a private nature, and eventually Mr. RANCE moved and Mr. MANN seconded—"That an offer be made to the water-works company (without prejudice) to assess the said company at £1600."

The proposition was carried unanimously, and the proceedings terminated.

CAMBRIDGE WATER-WORKS COMPANY.

The Ordinary Half-Yearly Meeting of the Company was held on the 28th ult., at the Office, Bene't Street—Rev. Dr. OKES in the chair.

In their report the directors recommended a dividend on the consolidated stock and amount of first, second, and third calls on new shares, for the half year ending Jan. 6, 1870, and on the amount of the fourth call from October, 1869, at the rate of 7½ per cent. per annum, to be paid on the 5th of April next, free of income-tax. The engineer and manager's report showed the progress of the company's business. The directors regretted that they had been unable to come to an amicable arrangement respecting the rateable value of the company's property in the Cambridge Union. The retiring directors were Messrs. C. Balls, Dennis Adams, and Edmond Foster, all of whom were eligible for re-election.

The engineer and manager's report stated that during the past half year water from the company's works had been laid on to 191 premises, the increased rental derivable from which is £147 per annum. The total number of premises now supplied is 4839. The general condition of the company's works (said Mr. Tomlison) continued satisfactory.

The abstract of accounts showed that the profits arising from the concern during the past half year amounted to £1551 18s. 4d. (the amount available for dividend).

The CHAIRMAN, in moving the reception of the reports, said they were of a favourable nature, inasmuch as last half year the directors could only recommend a 7 per cent. dividend. The directors had thought fit to take Mr. Tomlison as engineer as well as manager; and he took the opportunity of saying that Mr. Tomlison had given every satisfaction in what he had done. In case of extraordinary emergency, they could obtain an engineer of a higher standing. This appointment at present did not carry extra remuneration.

Mr. JOHN FULLER seconded the proposition.

Rev. Mr. FENWICK endeavoured to obtain some information respecting the new valuation of the company's property, and the negotiation with the Assessment Committee, mentioned in the directors report.

The CHAIRMAN declined to give the information, because on the previous day he received a further communication respecting the question, and as the matter was still in abeyance it had better not be discussed.

Mr. FENWICK then spoke of the advisability of ascertaining by special meeting the opinion of the body of shareholders in this and such other important cases, as it was of serious import to the large shareholders which course the direction took. Sometimes it might be advisable to forego a dividend to contest a point.

The CHAIRMAN said they might confide in the direction; they should continue their deliberations on this valuation question, and he trusted it would be brought to a just issue.

Alderman PEED wished to make a few remarks, not as secretary or solicitor to the company, but as a large shareholder. He thought the shareholders should be informed of the serious charge that would be made upon them, and he should take the responsibility upon himself, and tell them. If the proposed assessment, or anything like it, were adopted, it would take this company five years to recover their lost position, and instead of 7½ per cent., they would only get 6 as the next dividend. The Legislature had wisely made it imperative that the stock held by shareholders representing these meetings, and not persons, should control them, and Mr. Fenwick held as much as twenty or thirty shareholders, and therefore there could be do wonder at his anxiety. The matter of this new valuation placed the company in the most critical position it had ever been in; and, if adopted, the rate would be 5s. 3d. in the pound, which would thus fall extremely heavy on the large shareholders, whom he hoped the directors would consider. If the proposed assessment was acquiesced in, he should certainly sell his shares, and cease to take any interest in the company. It was monstrous. He might say that reputable legal opinion had been taken in the matter.

The reports were received.

The meeting agreed upon the dividend as recommended.

Messrs. C. Balls, D. Adams, and E. Foster were re-elected directors, and each gentleman returned thanks for his re-election.

A vote of thanks was passed to the chairman, in acknowledging which Dr. OKES passed a high eulogium upon the assistance rendred during the last quarter by Mr. Tomlison, their engineer and manager, and said he must acknowledge how much he was personally indebted to him for the information and assistance he had given to him as chairman of the company. He (the chairman) should continue to feel great interest in the company, more especially in the face of the present aspect of affairs.

WALTON-ON-THAMES AND WEYBRIDGE GAS COMPANY.

The First Half-Yearly Meeting of this Company was held at No. 3, Westminster Chambers, Victoria Street, on Monday, Jan. 31—E. H. J. CRAUFURD, Esq., M.P., in the chair.

After reading the advertisement convening the meeting, and affixing the company's seal to the register of shareholders,

The SECRETARY read the directors report, which was as follows:—

In presenting the balance-sheet and profit and loss account for the half year ending Dec. 31 last, the directors deem it their duty to give the shareholders a short statement of the commencement and progress of the company.

The Walton-on-Thames and Weybridge Gas Company was incorporated by the Act 32 & 33 Vict., c. 104, which obtained the Royal Assent on the 12th of July, 1869. The company, having been duly constituted, proceeded to negotiate for the purchase of the Walton Gas-Works, then the property of Messrs. Craufurd and Hay. The works were valued by the company's engineer, on the 10th of August, at £18,610, being £15,860 for the old works, £1000 for the expenses of the Act of Parliament, and £1750 on account of new buildings and extensions in progress. A contract for purchase was accordingly entered into on the basis of that valuation, the vendors agreeing to accept fully paid-up shares for £16,860, being the amount of the two sums of £15,860 and £1000 above mentioned, and the balance—£1750—in cash; the company agreeing to adopt the contracts for new buildings and extensions then in progress, and to pay for them in cash within fourteen days after the production of the certificate of the company's engineer. In the meantime, and until completion of the purchase, the vendors undertook to carry on and provide for payment of the contracts, they being allowed interest at the rate of 5 per cent. upon all payments made by them. It was further agreed that the company should take possession of the works from the 30th of June, 1869, all income and all outgoings from that date being credited and debited respectively to the company. In the meantime, it was agreed that the vendors should carry on the manufacture of gas for the company, and provide the necessary capital for that purpose, it being stipulated that, on completion of the purchase, an account should be taken of all income received and all outlays made, and the balance paid in cash. It was further stipulated

that the 1686 fully paid-up shares to be accepted by the vendors in part payment should be entitled to dividends from June 30, 1869.

The total cost of the contracts entered into by the vendors for new buildings, works, and mains is estimated at a little over £7000, including the £1750 mentioned in the valuation above referred to. The amount required for working capital may be taken at £1000. The directors, therefore, contemplate that a capital of £25,000 will be sufficient for the commencement of the first operations of the company. The total capital authorized by the Act is £30,000, in 3000 shares of £10 each, with borrowing powers to the extent of £7500. Up to the present time 2000 shares have been allotted, of which 1686, as mentioned above, are fully paid up, and on the remaining 314, £2 per share has been paid. The directors having been authorized by the first ordinary meeting of the company to raise on mortgage a sum of £5000, are now negotiating for a loan to that amount, thus constituting the required capital of £25,000.

The purchase of the works not having been finally completed until the 11th of January inst., the only amount appearing as capital in the balance-sheet is the sum of £120, being the amount of £2 per share deposit paid on 60 shares numbered 1 to 60, subscribed for by and allowed to the first directors of the company in the half year ending the 31st of December, 1869.

Under the contracts entered into by the vendors, and adopted by the company, the new buildings and works should have been completed and ready for use on the 1st of October, 1869. Owing, however, to the default of the contractors for the ironwork, they are yet unfinished. This delay has been the cause of serious loss and expense, as well as inconvenience in the manufacture. Notice has, therefore, been given to the contractors that the penalties under the contract for non-completion at the stipulated time will be strictly enforced.

The old works being inadequate to meet the increasing requirements for gas in the district, the task of carrying them on through this winter has been one of no ordinary difficulty. That this has been done successfully is due to the ability and energy of Mr. Robert Southwell, the manager for the vendors. At the same time, the defects in the works, coupled with considerable leakage in the mains, have produced a perceptible effect on the carbonizing account, the amount of gas sold being at the rate of only about 5600 cubic feet per ton of coal. The directors trust, therefore, that the profit and loss account, under these circumstances, will not be considered unsatisfactory.

The directors are confident that the new works designed by and erected under the superintendence of their engineer will meet with the approval not only of the shareholders, but of the gas consumers and the inhabitants of Walton generally. They have been constructed with much elegance, and with full provision for the prospective wants of the rapidly improving district comprised within the limits of the company's Act.

The whole of the mains are being gradually overhauled, repaired, or relaid, to reduce the leakage and improve the supply. A mile and a half of new 12-inch and 10-inch mains have already been laid up to and through Oatlands Park, and so soon as the weather permits mains will be laid to supply Hersham.

The accounts, duly confirmed by William Joseph White, Esq., public accountant, and Robert Smithson Parker, Esq., the auditors appointed at the first ordinary meeting of the company, are submitted for your approval, and the directors have much pleasure in recommending that the remuneration of the auditors be fixed at ten guineas each per annum.

The company appointed Mr. Robert Southwell to act as secretary during the past half year, while he was holding the situation of manager of the works under the vendors. The directors desire to recommend that a gratuity of ten guineas be awarded him for his services as secretary during that period. On the completion of the purchase of the works, the directors appointed Mr. Southwell manager as well as secretary of the company, and they have much pleasure in recommending that from the 1st of January, 1870, his salary as manager and secretary be fixed at £200 per annum, and that he be further provided by the company with a house, coals, and gas.

The directors beg also to submit for consideration the amount of remuneration to be awarded for their services. They would suggest that a sum not exceeding 100 guineas per annum be set apart for that purpose in the future, to be distributed in such manner as the directors may agree among themselves; and that for the past a sum of 25 guineas be awarded to the gentlemen who acted as first directors during the first six months of the company.

The accounts now submitted for your approval show a profit at the works of £534 13s. Deducting from this sum the amounts recommended for directors and auditors fees, and the gratuity to the secretary, together amounting to £47 5s., there remains a balance of £487 8s. available for dividend.

Out of this sum the directors recommend that a dividend at the rate of 4 per cent. per annum be declared, free of income-tax, on the amount actually paid on the 60 shares allotted to the first directors, and on the full amount of the 1686 fully paid-up shares allotted in part payment of the works, and that such dividend be payable on and after the 15th of February next.

The total amount required to pay such dividend is £339 12s., leaving a balance of £147 16s. to be carried forward to the account of the current half year.

Dr. PROFIT AND LOSS, *December* 31, 1869. *Cr.*

To Coals	£657 13 9	By Gas-rental	£1,249 9 5
Lime	42 15 8	Meter-rental	28 8 8
Wages	136 12 3	Coke	292 0 5
Wear and tear	31 8 0	Tar	16 9 8
Miscellaneous	24 7 4		
Rates and taxes	12 9 0		
Rent	20 0 0		
Discount	0 0 8		
Retorts	19 1 6		
Salary	100 0 0		
Interest	7 7 0		
Balance (being profit)	534 13 0		
	£1,586 8 2		£1,586 8 2

APPROPRIATION OF BALANCE.

To Directors fees	£26 5 0	By Balance—profit	£534 13 0
Auditors ditto	10 10 0		
Gratuity to secretary	10 10 0		
Dividend at 4 per cent. per annum, viz.:—			
1686 fully paid shares	337 4 0		
60 shares, £2 paid	2 8 0		
Balance unappropriated	147 16 0		
	£534 13 0		£534 13 0

On the motion of the CHAIRMAN, seconded by Mr. COOPER, it was resolved unanimously—"That the report of the directors, and the accounts for the half year ending the 31st of December last, now read, be received, confirmed, and adopted."

The following resolutions were also unanimously adopted:—

Moved by Mr. PENNY, seconded by Mr. ANDERSON—"That the remuneration of the auditors be fixed at the sum of £10 10s. each per annum."

Moved by Mr. ANDERSON, seconded by Mr. PENNY—"That Mr. Southwell's salary as the manager and secretary be fixed at £200 per annum, and that the company provide him with a house, coals, and gas, such salary and allowances to run from the 1st of January, 1870; and that a gratuity of £10 10s. be presented to Mr. Southwell for his services as secretary up to the 31st of December last."

Moved by Mr. ANDERSON, seconded by Mr. PARKER—"That the sum of £26 5s. be voted the first directors of the company for their services up to the first ordinary meeting of the company."

Moved by Mr. STEVENSON, seconded by Mr. PARKER—"That the remuneration of the directors be fixed at the sum of 100 guineas per annum, to be apportioned amongst them as they may determine."

Moved by the CHAIRMAN, seconded by Mr. COOPER—"That a dividend at the rate of 4 per cent. per annum be declared, free of income-tax, payable on and after the 15th day of February next, in accordance with the recommendations of the directors contained in their report."

After the usual compliment to the chairman, the meeting broke up.

DEATH OF MR. EDWIN UNWIN, OF SHEFFIELD.

The ink had scarcely dried in our pen after writing the notice of the death of one distinguished townsman, when we were called upon to resume it, to record the decease of another highly respected and most useful townsman, Alderman Edwin Unwin. His health has been manifestly falling for some time past, and a few weeks ago he went up to London for the professional advice of Sir Henry Thompson. Unfortunately, his illness there assumed such an aggravated form that he was unable to return home, and after lingering some days in a hopeless state, at his lodgings in Upper Wimpole Street, he expired on Monday, the 7th instant.

Mr. Unwin was born in June, 1804, and was the eldest of three brothers. He was put to the business of an accountant and collector, and at a very early age, through the default of his employer, great responsibilities were thrown upon him. His genius for figures, his strong good sense, and his integrity, enabled him so to bear this ordeal that he early established a high character, and laid the foundations for success in life. Mr. Unwin first came into public life as one of the Improvement Commissioners, a body constituted under a local Act in 1818, for lighting, cleansing, watching,, &c., the town, within a circle of three-quarters of a mile from the parish church. Mr. Unwin was elected a commissioner in August, 1830, and his colleagues at once availed themselves of his skill in accounts. They made him auditor, and the duty thus imposed upon him he performed every year till 1865, when the powers of the commissioners finally merged in the corporation. In those days the economical management of funds raised by rates was not treated with such scorn as it is in our Town Council now. It was the habit to respect the law, and not wilfully to spend the public money in ways known to be illegal. That the commissioners always kept financially within their means was not a little due to the accuracy with which Mr. Unwin looked after the accounts. In July, 1838, Mr. Unwin became one of the directors of the New Gas Company, and three years later he accepted the office of managing director, retiring from his profession as accountant. When in 1844 the two companies amalgamated, Mr. Unwin assumed the management] of the united concern, and we need not tell any man acquainted with Sheffield affairs how remarkably successful he has been. He carried the company triumphantly through the storm created by the Consumers Company, and when that unfortunate concern was merged in the United Company, we supposed that the accumulated capital thus to be dealt with had made it certain we should never see gas at a less rate than 4s. per 1000 feet. But now the company has got its maximum dividends and reserve-fund, it has greatly augmented the illuminating power of the gas, it has brought its works into a most efficient state, and it has largely reduced the price of gas, promising a further reduction. Under these circumstances, Alderman Unwin waited with great composure the attack threatened by the Town Council to compel the company to sell its works to the town. The present condition of the gas company is the triumph of Mr. Unwin's financial and administrative skill. Mr. Unwin was a guardian of the poor in 1843, and in 1845 was returned to the Town Council for Eccleshall ward. Having ceased to represent Eccleshall, he was returned in 1854 for Upper Hallam. In 1856 he was elected an alderman, to which office he was re-elected in 1862 and 1868. Since 1860 he has been chairman of the Finance Committee. Mr. Unwin has been a very useful and consistent member of the council, and in November, 1868, a requisition was presented to him, signed by 42 out of the 56 members, requesting him to stand for the mayoralty. We believe this flattering proposal had all but secured Mr. Unwin's consent, but under the urgent representations of his medical adviser he was compelled to decline it. From 1851 to 1868, when he resigned, he was one of the auditors of the Manchester, Sheffield, and Lincolnshire Railway. His appointment to that office gave great confidence to the Sheffield shareholders. On several occasions Mr. Unwin went as a member of deputations to the Dukes of Norfolk. In March, 1856, the then duke received an address of condolence on the death of his father, at his house in Carlton Terrace, and entertained the deputation. The present duke and his brother, Lord Edmund Bernard, sat down to table with their father and the deputation. A few months later the duke acknowledged the compliment by calling personally, accompanied by the late Mr. Ellison, upon each member of the deputation. In December, 1868, when the duke attained his majority, Mr. Unwin was again one of the deputation from the Town Council. The address was presented at Arundel Castle, and his grace entertained the deputation with great urbanity and hospitality. Alderman Unwin enjoyed a high degree of public respect, and laboured for the town with a degree of assiduity and efficiency which few can attain. On the 3rd of December he was called out of a meeting of the Town Council to attend the death of his wife, whom he has thus early been called to follow. Mr. Unwin leaves a son and two daughters, one of whom is married. —*Sheffield and Rotherham Independent.*

METROPOLIS GAS SUPPLY.

REPORT OF THE CHIEF GAS EXAMINER ON THE RESULTS OF THE DAILY TESTINGS OF THE GAS SUPPLIED TO THE CITY OF LONDON DURING THE QUARTER WHICH ENDED ON THE 31ST OF DECEMBER LAST.

To the Right Honourable the Lord Mayor, Aldermen, and Court of Common Council of the City of London.

My Lord Mayor and Gentlemen,—In conformity with the 71st section of the above cited Act of Parliament, I have the honour to report to you the results of the daily testings of the gas supplied to the City of London, during the months of October, November, and December last, by the City of London Gaslight and Coke Company, the Gaslight and Coke or Chartered Company, and the Great Central Gas Consumers Company.

The particulars of the illuminating power, and the amounts of impurity in each form on each day, are fully stated in the accompanying tables (Nos. 1 to 5), and the general results are as follows:—

1.—WITH RESPECT TO ILLUMINATING POWER.

The common gas supplied to the City by the three gas companies has ranged in illuminating power from an average of 14·78 standard sperm candles, in the case of the Chartered Gas, at Leadenhall Street, to 17·55 candles in that of the Great Central, at Friendly Place, Mile End, the maximum, minimum, and average proportions of illuminating power at the several stations having been as follows:—

Illuminating Power of the Gas in Standard Sperm Candles.

Name of Company and Description of Gas.		Max.	Min.	Average.
City of London Company	Cannel Gas	28·50	22·20	25·07
	Common Gas	17·80	15·20	16·26
Chartered Company	Do. Leadenhall Street	17·50	12·60	14·78
	Do. Gray's Inn Lane	17·90	14·40	15·69
Great Central Company	Common Gas	20·60	15·10	17·55

The gas of the City Company and of the Great Central Company has been at all times above the requirements of the Act of Parliament, but that of the Chartered Company, at Leadenhall Street, has been below the standard value (14 sperm candles) on twelve occasions; and on five of these they were the subjects of appeal to me by the company, who thought themselves aggrieved by the reports of the gas examiner, and therefore requested me to make strict inquiries into the following matters—viz., the soundness of the cubic foot measure and its fittings; the accuracy of the meter; the mode of regulating the supply of gas to the burner; the method of balancing and weighing the candles; and the correctness of all the calculations. I have reported to you, in detail, the results of my inquiries into these matters, and have informed you of my decision, after having heard the parties, that the company were in default.

It may interest you, if, as in my last quarterly report, I submit a tabular statement of the average illuminating power of the gas of each of the companies, according to the values of the three photometrical burners which have been successively used during the last 20 years.

Average Illuminating Power of Common Gas in Standard Sperm Candles, according to the Photometrical Values of different Burners.

Name of Company.	Old Brass Arg. Burner, 1852–63.	Sugg's Steatite Arg. Burner, 1864–69.	Sugg's New Lond. Argand, 1869.
City of London Company	12·62	14·02	16·26
Chartered Company { At Leadenhall Street	11·47	12·75	14·78
Chartered Company { At Gray's Inn Lane	12·18	13·53	15·69
Great Central Company	13·62	15·14	17·55

2.—As Regards Impurity.

Sulphuretted hydrogen has not been present at any time in the gas of the City of London and the Chartered Companies, but it has been present on 36 occasions in the gas of the Great Central Company. This has also been the subject of appeal to me by the company, and I have reported to you my decision—that the presence of the impurity was occasioned by an unavoidable cause or accident.

The amount of sulphur in other form than sulphuretted hydrogen has fluctuated to a very large extent. This will be evident from the following table:—

Grains of Sulphur per 100 *Cubic Feet of Gas.*

Name of Company and Description of Gas.	Max.	Min.	Average.
City of London Company { Cannel Gas	22·20	5·60	10·29
City of London Company { Common Gas	26·30	13·30	19·71
Chartered Company { Do. Leadenhall Street	28·50	14·00	23·73
Chartered Company { Do. Gray's Inn Lane	33·70	17·40	21·46
Great Central Company. Common Gas	23·70	5·10	12·47

It is apparent from these results, as well as from others which I have reported to you, that the proportion of sulphur can be easily maintained below an average of 20 grains per 100 cubic feet of gas; and it is extremely desirable that the referees appointed by the Board of Trade should take this matter at once into their consideration, and prescribe, without further delay, the maximum amount of sulphur allowable in the gas supplied to the public, for in the absence of any declared quantity there is evidently no inducement with one of the companies to supply gas as free as possible from this important impurity. What, indeed, can be more striking than the average proportion of sulphur in the Chartered and the Great Central gas—the former being as high as 24·46 grains per 100 cubic feet of gas, and the latter as low as 12·47 grains? The amount of ammonia has also ranged to a considerable extent, as will be remarked in the following table:—

Grains of Ammonia per 100 *Cubic Feet of Gas.*

Name of Company and Description of Gas.	Max.	Min.	Average.
City of London Company. { Cannel Gas	0·00	0·00	0·00
City of London Company. { Common Gas	0·00	0·00	0·00
Chartered Company { Do. Leadenhall St.	8·90	2·00	3·84
Chartered Company { Do. Gray's Inn Lane	19·60	1·00	6·73
Great Central Company. Common Gas.	11·00	0·00	1·01

The maximum amount of ammonia allowable in the gas supplied to the City is 5 grains per 100 cubic feet, and, by reference to the tables, it will be seen that the gas of the City of London Company has been at all times free from this impurity, while that of the Chartered has been frequently surcharged with it. The gas, for example, of this company, at Leadenhall Street, has contained an excess of ammonia on nine occasions; while that at Gray's Inn Lane has been surcharged with it on 44 occasions. It was caused by the lime which was put into the tanks of the gasholders for the purpose of absorbing the sulphuretted hydrogen of the water.

In conclusion, it affords me the highest satisfaction to state that the gas supplied to the City by the City of London Gaslight and Coke Company has at all times been equal to the requirements of the Act of Parliament; and excepting the traces of sulphuretted hydrogen, which were unavoidable, the same has been the case with the gas of the Great Central Company.—I have, &c.,

Hy. Letheby, M.B., M.A., &c.,
Chief Gas Examiner.

17, *Sussex Place, Regent's Park, Jan.* 1, 1870.

METROPOLIS WATER SUPPLY.

Metropolitan Board of Works.

On Friday, Jan. 28, the Board—Sir J. Thwaites in the chair—resumed their consideration of the report from the Works and General Purposes Committee, on the subject of a constant water supply to the metropolis.

Mr. Roche, in moving the amendment of which he had given notice, said, on the question of the quantity of water and its cost for the purposes of fires, Captain Shaw had been kind enough to supply him with some data showing the quantity required for putting out fires in the course of the year, and the cost of that water; and honourable members would be very much surprised when they found the small expense it was. Captain Shaw stated that the quantity required for one year was 8 million gallons, which, at £25 per million gallons, would cost £200 per annum. It had been said that it was wrong to throw upon the consumers the cost of water used for public purposes. He contended that they did not do so, and the only water used for public purposes, and unpaid for by the public body, was water of the value of £200 per annum used by the board. So far as the sanitary question was concerned, it rested entirely with the district boards. It was quite within the power of a local government to see that no nuisance was created, and to see that the owners of property did that which was necessary and proper to prevent disease. The vestries and district boards had the most complete powers at the present moment, and, if there was any defect whatever, there was no fault to find with the companies, who were ready to bring the water, and, if there was a constant supply, would of course be equally bound to bring it in. Whatever defects there might be with reference to cisterns or with reference to the houses, the local governments could, by the exercise of the powers entrusted to them by the Act of Parliament, compel them to be altered; and, therefore, it was idle to assert that the simple expedient of this board undertaking the supply was to produce such an alteration in the social habits of the people of London. The question must inevitably resolve itself simply into one of finance. The consumer of water must pay for it in meal or in malt. He must pay for it as water-rent, or as water-rate, or tax, or by an addition to his rent, the landlord paying the rate. Then, surely, the object of the consumer must naturally be, and more so if he were a poor man, to get the water supply at the least possible cost. It was therefore necessary for those advocating the supply by the corporation to show that it could be supplied cheaper in that way than by the companies. He ventured to ask the board whether it had been satisfactorily proved to them that there would be a large profit accruing to the board, or whether it had been satisfactorily shown that the price would be greatly reduced to the inhabitants. The object of his amendment was to obtain that constant supply at the same price they were now paying for the intermittent supply, because the evidence taken before the committee of 1857 had shown very clearly the opinion of Parliament that there was to be no increase in the price, but that the companies were to supply at the same price. He referred to figures to show that so far from the board being enabled to supply water at a less price than it was now supplied, the cost to the consumers must inevitably be more than it was at the present time. There was extracted from the pockets of the ratepayers of the metropolis at the present moment £799,000, less a sum of £162,000, which was received for trade purposes, and supplying water outside the metropolis, leaving a net sum of £636,500, which at present was taken out of the pockets of consumers of water in the metropolis. That was 866, and the addition of 10 per cent. would give an accurate result at the present time. To raise that sum of £636,000 a rate of 9½d. in the pound was necessary. Mr. Freeman had stated that it would cost one-sixth less, so bringing it down to something like 8¼d.; so that, according to him, the supply being in the hands of the board, the consumers of water in the metropolis would have it by paying 8d. in the pound upon the assessable rateable value of their property. Mr. Roche could not by any possible means arrive at any other conclusion than this, that the sum of money which would be required to be raised for the purpose of supplying the metropolis with water would be, at all events for the first year, a sum of £779,000—the intereston £10,400,000, repayment of capital, one-sixtieth part each year, £166,000; annual expenditure, £388,000; making together £954,000; deducting from that the amount received for supply outside the metropolis, £175,000, a net sum was left of £779,000 to be raised supposing the system to be in complete operation within the metropolis, and undertaken by the board. He stated then, and repeated, that it would require on £18,000,000 of money a 3d. rate to produce £222,500, and a domestic rate of 1s. on £12,000,000 of property, producing £550,000; making together £772,500. So that, supposing the sum of £779,000 had to be raised by a domestic rate, and by a rate over the metropolis, it would require a 3d. rate over the metropolis, and a domestic rate of 1s. If that were so, how was it shown that they were going to get their water at 8d. upon the assessable value? At all events those who advocated a change must show, in the clearest possible manner, by figures, which were undoubted and reliable, if they were not to be in the position of gainers by the change, what reason there was for the board undertaking it. Manchester had been referred to, but Manchester was able to keep down the low rate of 1s., as they called it, because they could supply a large district outside, which they charged much higher than they did those inside, and because they had a large amount of water which they supplied for trading and manufacturing purposes. He said at once that it was no part of the duty of a corporation to become a trading concern to supply people outside the area, and to compel them to pay more in order to get water cheap within the area. That was no part of their duty. The duty of a corporation could only extend to those within its limits; and if they were to say they intended to tax Richmond, Twickenham, and various other places outside the metropolis, and to make them pay a much higher rate than we are paying within, and that for our own benefit, it made them nothing more nor less than a trading company; and it was a position which, as a corporation, they would not be justified in assuming. The total expenditure at Manchester was £120,000; in round numbers, they received £80,000 for trading purposes, and purposes without the city—45,000 of that was for trading purposes, and £35,000 for outside the city—so that out of their £120,000 they got back the sum of about £80,000, leaving only about £40,000, in round numbers, to be paid out of the supply in the city. But what was the case in London? They had no soft water to sell for trading purposes. The water they had to sell was to some extent unfitted for manufacturing purposes, and all the water they might sell for trade purposes, instead of being nearly two-thirds of the whole expenditure, amounted to only one-fifth. The total amount they could receive for trade purposes would be about £125,000 a year, to meet an expenditure of £779,000. They had not the means that Manchester had of making a trading concern of it, and getting a benefit for the domestic consumer at the expense of the trade consumer. He ventured to say the average amount per 1000 gallons charged by the London companies would be found to work out at less than the average amount charged at Manchester. If that was so, he did not see how they could, for one moment, take Manchester as an example by which London might expect to get its water cheaply. First of all they got no remunerative return from the trade supplies, and he was quite sure they would never be able to tax those outside the area one penny more than those within. How that would be worked out it was very difficult to say. They might say this: If Manchester, with everything that could be said in favour of it as a corporation, and a trading corporation, could not supply at less than 9d. and 3d., there was no probability or possibility that the Metropolitan Board could effect what Manchester could not. Brighton was referred to by his friend, Mr. White, as a town to which they should go and take example. If they looked to Brighton, they would see that the companies on the constant supply system could supply water cheaper than they did in Manchester. If private companies could supply them properly in Brighton, and at a fair legitimate cost, he might fairly say the private companies in London would be enabled to do what the private companies of Brighton could do. The resolutions he had proposed it was said would entail great expense on the board. He thought £5000 or £10,000 a year paid by the board for the purpose of controlling the companies would be much better expended than increasing the rates of the metropolis by 3d. in the pound. The one would cost, say, £10,000 a year, and the other would take something like £230,000 a year out of the pockets of the ratepayers. With respect to the control set forth in these resolutions, they were not his resolutions; they were simply those of the committee of the House of Commons in 1867, of which Colonel Hogg was a member. They were resolutions recommending the principle of leaving to the companies the supply—leaving to them all the risk of loss—merely investing in the board and the proper corporation over the metropolis such controlling powers as would compel the company having a monopoly to give a proper supply to the inhabitants, and at the same time protecting the company from the dishonesty of many of the consumers of water, who waste it to an enormous extent. That seemed to be the entire principle of these resolutions, which he thought likely to meet with the approval of the public in general. He concluded by moving, as an amendment—"That this board does not concur in the conclusion arrived at by the Royal Commission on Water Supply—viz., 'That the constant service system cannot be effectually carried out in London so long as the supply remains in the hands of private companies;'" and "That this board concurs in the general policy enunciated in the report of the select committee on East London Water Bills, 1867," &c.

Mr. Shaw seconded the amendment, and read and commented on the letter of the West Middlesex Water Company, which appeared in our last. He was very doubtful of what the result would be if they took those companies, and for his own part did not think it was their duty so to take them. Supervision was desirable enough. Parliament had said, "If you see reasons, consult these companies; when you have consulted them, if it is then necessary to come to us, come to us, and we will hear what you have to say." But if they went to the Secretary of State now he would tell them, "Do what the committee has told you to do—go back and consult these companies." If Parliament thought it necessary to take steps in the matter, it would do so, and it would consult the water-works companies, and he thought it very necessary that they (the Board of Works) should consult the water-works companies also. The Royal Commission admitted that there were difficulties which would take years to overcome. He, therefore, had much pleasure in supporting the amendment.

Mr. Newton said he did not see that this amendment commended itself even so much as Mr. Shaw's did to the consideration of the members, and certainly not by reason of any argument that had been used that day which would induce them to adopt his amendment. After referring to what he called the unfair way in which figures, truthful in themselves, had been used by the mover, and applied in such a way as to make them absolutely false, he said reference had been made to the small consumption of water used for putting out fires. Whatever it was, it ought to be fairly paid for. It was stated in the report of the Royal Commission, that the insurance companies were charging some of the property belonging to the board in Southwark Street a higher rate of premium upon their insurances, because the mains in that street were inadequate to the putting out of fires, and, in answer to applications that they should put larger mains, the water companies said: "Our mains are sufficiently large to supply all the requirements for domestic uses, and we are not bound by any of our Acts of Parliament to supply a larger main than is necessary for that purpose merely upon the contingency of a fire occurring in that district."

That was a sort of thing that should not exist; but it showed that they could not get everything that was necessary and essential to be done so long as the matter was in the hands of a commercial company. Mr. Roche said that neither that board nor any corporation had any right to become a trading community: no commercial company should have the right of taxation. To supply water to a house, and then rate them upon a certain value of the house and not upon the consumption of the thing itself, was not selling water, but the exercise of a power analogous to any other placed in municipal bodies; it was the power of taxation, not of buying and selling; and if there was force in Mr. Roche's argument that a corporation should not be a trading community, there was still greater force in this argument—that a trading community never ought to be entrusted with the taxation of the people. But he did not see that that argument would avail against the proposition that the corporation should undertake the supply of such a necessity as this. Government sanctioned corporations taking into their own hands the supply of those things which were essential for the community they governed, and which could not be obtained by the ordinary means of competitive supply; and he (Mr. Newton) endeavoured to lay down the principle that, where an article was essential to human existence, and could only be obtained from one source and distributed through one system, there was necessarily an absence of all those commercial principles which regulated the supply of articles of food and other necessaries of life; and when those conditions existed precisely as they did exist in relation to water, it was then the duty of a corporation to step in for the protection of the community they governed, and to take it out of the hands of men whose first interest was not the welfare of the people but the dividends of the shareholders. He believed that principle was a sound one; he believed it was the duty of a corporation to undertake the supply of water, and thought it would be financially a success; and was quite certain, if it was financially a success, it would be a great sanitary advantage; and he quite agreed with the principle enunciated by Mr. Runtz, that, when the two questions came in juxtaposition, if ever they did, their first attention was to be paid to the sanitary condition of the people.

Mr. Dresser Rogers said the amendment appeared to him to be drawn very cleverly. It meant only this—that the companies at the present time could take upon themselves the constant supply of the metropolis with water, as against a corporation like the Metropolitan Board of Works taking upon themselves to do it. That being the case, the issue was very simple indeed. He apprehended the majority of the board were of opinion that the supply should be in the hands of some public body, and he did not think Mr. Roche's argument against the board having the supply at all applied to Mr. Freeman's proposition. Mr. Freeman had not said that this board was the board to have it; he merely stated in terms that the Royal Commission made a certain report in which they stated that some public body ought to have the administration of this great necessity. They being the only body in the metropolis which had authority over the whole of the metropolis, naturally ought to take upon themselves, at all events, the onus of going to the Government and saying to them, "If this is cast upon anybody at all outside the City of London, at all events we ought to be the parties to have it." Again, Mr. Freeman in his motion did not commit the board to anything at all with regard to the report itself; there was a general approval. Every man must approve of the report; no one reading that report could help seeing that it was the most admirable book ever printed in the English language on this question. The motion was an expression of approval of the report, and stated the position of the board. Mr. Roche argued very cleverly about the fire brigade, and the supply of water for putting out fires costing £200. Did they pay for all the water for putting out fires directly? Did not they pay for it indirectly? Was not the cost of bringing water to the metropolis included in the charge made. If they spent so much water in fires, and that caused other works for storeage of water, was not the cost spread over the entire area of the metropolis? Then as to the £200, he supposed Mr. Roche meant the water supplied to the fire stations; he could not, of course, mean the putting out of fires. Captain Shaw could not intend that the cost of all the water was gauged exactly with regard to putting out fires in the metropolis; and therefore he said, if so many hundred thousand gallons of water were expended in putting out fires, and they did not know by gauging in the meter the quantity of water consumed, the expenditure for storeage and distribution was cast over the whole of the ratepayers. He apprehended the board were bound to meet this case boldly and effectually, and was quite certain the motion of Mr. Freeman was so moderate in its character—it did not commit the board to anything—and the interest of the inhabitants of the metropolis so clearly pointed in its direction, that it would commend itself to their cordial support.

Mr. Cook said they could not compare what the companies were now doing with what they wished them to do, or what they wished to do themselves. Some of them thought the supply was defective in quantity and some of it defective in quality. He had in his hand a paper dated Jan. 24, 1870, from the Royal College of Chemistry, signed by Dr. Frankland, stating that, of the waters obtained from other sources, those delivered by the New River were perfectly clear and transparent, while those supplied by the East London Company were very turbid, owing to the presence of a large amount of suspended matter full of living organisms. The board had no certain data to go upon, and that rendered them unable to deal with this matter on the ground of expense. He, therefore, did not attach so much importance to showing that it would be cheaper to that board or any other body to supply London with water than to trust it to the companies. He rather thought, instead of dealing with figures, as reasonable men who were in the habit of acting upon principles, they should deal with principles, and not look to see which was the cheaper by reason of figures, which were uncertain. There was another matter which Mr. Roche quite ignored. He said, instead of dealing with this matter, and taking it in hand, they should adopt the report of the committee of 1867; but in his comparison of the cost of the two systems, he said nothing about the cost the ratepayers were to be put to through the board exercising a supervision over them. Who was to pay the district surveyors for examining the water apparatus? Who was to pay for the survey of all the houses, that was to be undertaken by the board according to the recommendation? Clearly it must come out of the ratepayers pockets, and clearly it would be a cost on the water. The whole figures on both sides of the question were so uncertain that he thought they were much safer in dealing with principles, and judging from them, than they were from any set of figures brought before them. He contended, on the broad general principle, that the municipality of a large city was the right body to have the control of the water. Let them bear in mind that great cities were an entirely abnormal condition of human life. When man was found scattered over the whole area of the country he got water without any difficulty at all. There were natural streams and springs, and it cost a man no trouble to get a proper supply of water, any more than it did to get a proper supply of fresh air. But take him out of that position, and bring him into a large city, and he had not only to look after a supply of fresh air, but after a supply of pure water. Now, who looked after the supply of fresh air? When man was found in his normal condition, having a large and proper portion of open country about him, there was no difficulty about the sewage question, or offensive gases resulting from sewage, because nature had provided a proper receptacle for that. But bring him into his abnormal condition, and place him in a large town, and then this became a difficulty. Who dealt with this question? It was entrusted to the body who represented the whole community. They could go back thousands of years, and from the conduits and aqueducts of Rome they knew quite well the state of Rome recognized this necessity, and that they considered water supply was so essential to the well-being of the community that they took it in hand. The fact of supplying London by public companies was only a matter of recent date, dating from the time the New River Company started, and if the body which represented the municipality of London had been wide awake, they never would have allowed a public company to step in and interfere with that which was the right and duty of the corporation. As they at the present day suffered from the lapses of their forefathers in building narrow streets and other things, and had to repair them, so in this matter they were suffering from the lapses of their forefathers, and must try and repair the defects which had been left them. However, the question was not what ought to be, but what was. They found at the present time that London was served, and served tolerably well, by the companies as far as they went. But the people of London were quite determined to be served a great deal better, and the question was, as there was to be a great change, how should this great change be effected? Should they revert to what was the natural principle of the thing, and restore the way which ought never to have been departed from—giving the municipality the charge of water as the charge of the air—or should they try and make a kind of mixed and mongrel arrangement by letting the companies have a certain amount of control by giving the municipality some sort of half-and-half authority over the companies? It seemed to him the rational thing was to go back to first principles, to see where they went wrong in departing from them, and to restore London into its proper condition. On principle, they might naturally expect that if they went back to what was the normal and right condition of the supply of water in London, they might naturally expect it would be cheaper, as well as better, for the ratepayers. And why? For this reason—that the companies who were supplying London were getting a profit out of it; they were making an annual income out of the supply of water to the inhabitants of London, whereas if the board did it they did not want to make any profit out of it. There seemed to be a difference between a life office which was a mutual office and a life office which had shareholders. If a friend came and asked him which office he should insure his life in, he should say, "Go and insure in a mutual office, because whatever benefits result from doing so you will get the benefit of it." The same principle held with regard to the supply of water. Eventually it must come to this, that the whole body of inhabitants would get the benefit of supplying themselves, instead of the profits of doing so going into the pockets of shareholders of companies. If it was put into the hands of a municipality, it must be cheaper to the ratepayers. Another reason why it must be better to the ratepayers was, that if the ratepayers were doing it for themselves, their interests were the same as those who were carrying on the works; whereas, at the present time, the interests of the shareholders of the company were opposed to the interests of those they supply. They wanted to get as much dividend out of their work as possible, and did not consider, first of all, the health of those for whom the water was supplied. If the water supply was placed in the hands of the municipality, the first consideration would be the interests of those to whom the water was supplied. Another thing was, it would avoid the expense of multifarious management. There were at present eight companies supplying London, each with a staff of officers, all of whom must be paid by the ratepayers. That would be reduced to one staff; and the class of expense of the companies was precisely the same class of expense as the expense of a public body would be. It was often said public bodies were a great deal more extravagant in their expenses than individuals, but the same held quite good of public companies. If the water supply were effected by eight individuals who looked after their own work, it might be said that those eight men, looking after their work thoroughly, would do the thing cheaper than a public board could do it; but, knowing a good deal of public companies, they knew if public boards were extravagant in their management, many public bodies were equally extravagant. There was nobody at the head of a great public company whose interest suffered by loss; there was a great body of shareholders over whom the expense was spread. The expense of each of these companies was precisely the same kind of expense as the expense of a public board would be; and if they did away with eight separate staffs, and had one large staff under one management, there must be a considerable saving. On this ground, putting figures on one side, and looking at the principles involved in this question, he thought they could come to no other conclusion than the conclusion the commission had come to, and on the question whether it should be as it now was, or whether the water supply should be in the hands of the representatives of the municipal body, there could be no doubt that, on principle, it should come into the hands of the municipal body of London, whatever that might be.

Mr. Thompson said he had been somewhat suprised to hear Mr. Roche repeat the statement that it would take £166,000 a year to purchase 10 millions of stock during 60 years. Mr. Roche seemed to have endeavoured somewhat to alarm the inhabitants of London, by leading them to believe that something like 2d. or 3d. in the pound would be wanted for the purpose of purchasing these water companies. He thought it would be quite right, if the board undertook the management of the water supply of the metropolis, that they should form a sinking-fund; but what would the sum of £166,000 a year amount to in the 60 years which Mr. Roche had stated it would be necessary to charge that sum, as against the ratepayers, to reimburse this money? The £166,000 would come to £10,000,000 in round numbers, but the interest on it at 4 per cent.—£400,000 a year—during the same time, would make no less a sum than £11,952,000. He thought, instead of fixing an arbitrary period of 60 years, or a shorter number of years, it would be wise to take a longer time into consideration. He was prepared to say from figures, that if the payment were spread over 100 years instead of 60, instead of a rate of 2½d. in the pound being required to pay off the £10,000,000, a rate of much less that 1d. would be sufficient. What would be the product of £50,000 a year taken during 100 years? It would amount to the principal sum of £5,000,000, but the interest at 4 per cent. during the same time would amount to another £10,000,000; so that by £50,000 a year instead of £166,000 a year they would have, during the period of 100 years, sufficient to pay off the capital money, and have £5,000,000 to use for works of extension. If £40,000 a year were set aside during a period of 100 years, it would with its interest at 4 per cent. amount to £12,000,000; so that they would have enough to pay off the whole amount of the loan, and have something for works of progress or extension too. He should not have risen at all, but was fearful that these figures going forth to the public might alarm them. His argument was that the sum of £40,000 a year, put aside for the purpose of buying these £10,000,000 of stock, would, at the rate of 4 per cent., effect this purpose in 100 years time, and leave £2,000,000 of money.

Mr. Healy said he did not think Mr. Runtz went the right way to attain the object of his desires. Mr. Runtz said it would be far better that the management of the water companies should be under either that board, or some such board as theirs, because then it would be done cheaper. He (Mr. Healey) begged to differ with him, for he was perfectly satisfied that instead of obtaining water cheaper, the charge would be at least 25 per cent. extra. Some gentlemen said that in some parts of the metropolis they had not got good quality. The district which he represented (St. Pancras) was one of the largest in the metropolis, and the New River Company supplied, if not quite all, more than two-thirds of the parish. They never heard any complaint about the quality or quantity; the parishioners, generally speaking, were very well satisfied, and they did not hear much about price. Therefore, as far as those remarks of Mr. Runtz's went, in their locality they had no fault to find. Mr. Newton thought it would be done much better if the companies were all concentrated. Centralization seemed the order of the day, but it was not always desirable. A few years ago there were 16 different paving boards in his parish. It was thought desirable that they should be concentrated, and the result was

a very large increase of pay; and he believed that would be the result if the proposal now before the board was carried out. Then they must consider whether it was desirable that the board should be made a trading company. If they took the water supply out of the hands of eight companies, and concentrated it in the board, it would constitute a monopoly, and would, comparatively speaking, annihilate all fair competition. Then, who was to be responsible to the board—who was to manage the matter and to incur all the responsibility? He was sure, if they studied the interests of the ratepayers of the metropolis at all, they would not adopt the proposition submitted by Mr. Freeman, or, if they did so, he was sure they would be sorry for it before long.

Mr. FREEMAN having replied,

The amendment was put to the board, and was rejected by 18 to 10.

Mr. SAVAGE moved the adjournment of the debate.

The debate was accordingly adjourned until Friday, Feb. 4.

FRIDAY, FEB. 4.

Mr. RICHARDSON thought it was an unwise thing for the board at any time to deal in generalities upon a deeply important question. The terms of the motion might be much more definite than an expression of "general approval." When assent was asked to an approval of the report of the Royal Commission, it was necessary to consider what that report referred to. It was composed of three grand divisions—the first relating to the source of the supply for the metropolis, the second to the constancy of the supply, and the third to the transfer of the management of that supply from the present companies to a local authority, or, in truth, to the Board of Works, because that is the only authority in the metropolis which can be called in any respect municipal. If the transfer is effected, it will, therefore, be either to the board or the board's successors. With the conclusions of the Royal Commission as to each of these three matters, the board was asked by the motion to express its concurrence. On the other hand, his amendment asked the board to take quite a different view. The one thing required was a constant supply of pure and wholesome water. One or two members of the board, perhaps, objected to a constant supply, but practically the board were unanimous on that point. The question of purity and wholesomeness, however, was hardly raised by Mr. Freeman. No doubt it might be said that it was indirectly raised by the recommendation of the report of the commissioners to go to the Thames for the supply. He contended, on the other hand, that the Thames never can afford a supply of pure and wholesome water. Then, on the third division of the report, he considered that the board ought not to express an opinion on the question of the transfer, even though they were unanimous in the conclusion that it was desirable that the supply should be in their own hands. Unhesitatingly he said it would be impolitic to put such a resolution on the minutes. As a rule, a board like the Metropolitan Board of Works, which was created by the Legislature for certain definite and specific purposes, should always, as far as possible, keep itself within the four corners of its duties and powers; and, if other duties were added, the initiation of such things should be with the Government or the Legislature. The board had only once attempted to increase their powers of taxation since he had been a member, and no motion was ever more thoroughly thrown upon its back, or ever more utterly failed. If, then, the board wished to pursue a politic course—politic as regards both the Legislature and the public—it would be better to remain quiescent on a question of this kind, and to refuse to express an opinion upon it; but inasmuch as it is possible that, in accordance with the recommendations of the commission, Parliament may say that the Board of Works is the proper authority to undertake this large and important duty, they ought not to be behindhand in their readiness to discharge every duty that the Legislature may put upon them. This was the real essence of his amendment as compared with the resolution. Another view he took of the matter was, that as they were all desirous of the same thing—a pure, and wholesome, and constant supply of water—as they all wanted the best they could get for the metropolis, there must be a great infirmity amongst the members of the board if, in this simple state of things, they passed a resolution such as that proposed by Mr. Freeman by a bare majority. Their chairman would then have to take it up to Her Majesty's Government, and when the minister asked, "Are your board unanimous?" the answer would have to be, "Oh, no! it was passed by a bare majority of two or three." What weight would be attached to such a communication as that? It would be placing the chairman in a most unfortunate position to oblige him to carry up such a thing to the Government. Surely there were common grounds upon which the board could act with regard to this vast question. Let them, then, frame some resolution which should meet with general approval. Because he was the author of the amendment he did not ask them to look upon it with the favourable eyes with which he regarded it. He was quite willing to accept any other. The honourable member proceeded to discuss the relative merits of the water obtained from the chalk districts and that obtained from the river, but was called to order by

The CHAIRMAN, who said the question before the board was not as to the quality of the water, but whether they desired that the management should remain as now in the hands of private companies, or be transferred to a municipal authority.

Mr. RICHARDSON said one of the points which he asked the board's approval of in his amendment was, that the existing supplies are not satisfactory, and that the Thames water was an unsatisfactory, and never could be a satisfactory, water for the metropolis. Just this time last year Dr. Frankland drew out a report, in which he stated that the waters delivered in London during the latter part of January, by the Chelsea and Lambeth companies, were in such a muddy condition as to be totally unfit for use. This was caused by the Thames overflowing its banks in some parts. The water supplied by the West Middlesex Company, though well filtered, had been so contaminated to an extent which would be produced by the admixture of one-third of a gallon of average filtered London sewage with each 10 gallons of the water. Dr. Frankland's report for the present month was akin to this, and he maintains that every year about this season, let the companies do what they would in regard to filtration, the water supply was of a most unsatisfactory kind as regards quality. He stated but a short time ago that by means of the microscope he had been able to detect large quantities of living organisms in the water, which were distinctly the concomitants of water which had been contaminated by sewage. Was it possible, then, that the board, representing the metropolis, could declare such a water to be *par excellence* the water for the use of the metropolis?

The CHAIRMAN: All the other medical evidence is opposed to Dr. Frankland's.

Mr. RICHARDSON said he thought not. Take Dr. Simon's evidence. He was asked, "Supposing that sewage is discharged from one of the sewers in Windsor, would it be possible to detect that sewage seven miles lower down?" His answer was, "I believe it would be absolutely impossible for chemists to discover it, but the practical sanitary question is different." He was then asked, "Suppose tapeworm eggs were sent into the river, would those be alive seven miles down, or the discharges of cholera or typhoid fever?" His answer was, "It is not a question whether a chemist would find out the organical matter so much as a question whether those particular molecules would still have their property seven miles down. I cannot say that they would not." In another part of his evidence he stated that Thames water could not be sufficiently purified by filtration. Take Dr. Angus Smith's evidence. He said: "Granted that you could possibly filtrate it so as to render it reasonably pure, still there is the sentiment remaining. We do not like that any sewage should enter the water that we drink." Many others gave their evidence in the same direction. Dr. Lion Playfair gave his evidence against using Thames water, so did Dr. Simson, Dr. Forbes, and Dr. Parkes. Dr. Parkes was asked, "Is there, in your judgment, an objection to the Thames basin as a gathering area for water, by reason of the high state of cultivation in some parts, and from the manuring it undergoes?" His answer was, "Yes; I think there is a very great objection. It is impossible to ensure the safety of water, where there is the possibility of contamination on a large scale with organic matters derived from sewage." Dr. Letheby and Dr. Odling held the opposite view, but all the witnesses except three were against the idea that Thames water could be completely purified for drinking. He, therefore, was decidedly of opinion that the evidence which the board at present had before them would not justify them in saying that they came to the conclusion that the Thames water was the proper water for drinking purposes. Of course, if there was no other source of supply, Thames water must perforce be used; but until that fact was clearly ascertained, the board, as a representative body, could not be justified in approving of a recommendation directly opposed to the evidence before them. What, again, has been the result of supplying Thames water during the last few years? Take Mr. Cook's district, or Mr. Runtz's district. Had not those districts been fearfully visited by cholera, and was it not an almost unquestioned fact, that a very great cause, if not the primary cause, of the extension of the disease was the quality of the water supplied? Why was this? Because water taken out of the Thames, and subjected to filtration, had all kinds of contingencies attaching to it, and in the event of a very slight accident it might be distributed in a most impure state. For this reason, too, he thought the board could not say that the Thames water was fit to be supplied to the metropolis. With regard to the question of constancy, he hoped the board would be moderate in their demands. The poorer classes generally lived in courts and alleys, and if each house was fitted up, the taps and other apparatus would very soon be stolen; he therefore thought that it would be sufficient in such cases to provide a proper standpipe for the whole court. As far as the members of the board were concerned, a constant supply, though perhaps agreeable, was by no means necessary, their cisterns being sufficiently large to store all the water required. Still, if the supply was made constant, no doubt very much more would be used than at present. In the summer-time their gardens and croquet-lawns would be far more plentifully watered than under the present time.

Mr. TURNER: I rise to order, and to ask whether Mr. Richardson, having enunciated in his amendment that we are of opinion that a constant supply is necessary, is now at liberty to argue that a constant supply is not necessary.

Mr. RICHARDSON repeated his opinion that a larger quantity than before would be used, especially when those in the position of the members of the board would not have to pay for it. They would use a great deal for other than necessary purposes, while the poor, not requiring any except for necessary purposes, would have to pay equally with the rich under the double rate arrangement, and thus be really paying for the luxuries enjoyed by those better able than themselves to pay for them. This would be a most unfair course to pursue. With regard to the question of transfer, all he had to say was that he did not think it would be politic for the board, even though all of the same opinion, to express the conclusion contained in the motion. He strongly urged them to adopt any other resolution than that which was now before them, and not to pledge themselves, either directly or inferentially, to the statement that they regarded themselves as the proper body to which the management of the water supply should be transferred.

Mr. COLLINSON seconded the amendment, in order to continue the debate. He felt that the subject of the water supply was more important for his district than for that of any other member of the board. Certainly no other part of London was so badly supplied, and suffered so severely, socially and morally, in consequence. He wished to look at the question merely as it affected the public at large. What had been the result of the legislation of the past 16 years with regard to the water supply? Why, as far as London was concerned, not a quarter enough was supplied, and he believed that no improvement would take place so long as the companies had the control. Sixteen or eighteen years ago he was connected with an association which was formed for the purpose of urging this question upon the attention of the Government. In 1851 a measure was introduced into Parliament, but not passed; but in 1852 Sir George Grey brought in a bill, and the Government of the day acted in good faith with the public at large, for one of the provisions was that the water companies, subject to the provisions of their private Acts, should keep in their district mains then laid down or afterwards to be laid down a constant supply of pure and wholesome water. Unfortunately there was no Board of Works at that time to look after the public interests, and the consequence was that the water companies succeeded in getting a proviso inserted, to the effect that the companies should not be compelled to give a constant supply until four-fifths of the inhabitants asked for it, and not even then unless arrangements, approved of by the companies, were made in every house. That difficulty has stood in the way for sixteen years, and the public are no better off now than before the bill was passed. During last autumn he was engaged with a sub-committee in visiting different streets in his district, and inspecting the arrangements for the supply of water, and he found that the poorer people only had a quarter of an hour or twenty minutes supply five times a week, and that at five or six o'clock in the morning. In many cases there were no cisterns or butts provided, even for houses inhabited by four or even five families, and the only supply the poor people had was for about a quarter of an hour in the early morning. It was no use complaining to the landlords. His district board had frequently sent to landlords requiring them to provide proper arrangements for the reception of water; but the answer in almost every case was, that the companies would not turn the water on long enough. He himself had many times gone to the companies, and was always politely received, with the answer, "We will send down our inspector." But the people do not want inspectors, they want water. In his district there is scarcely ever a supply on Sunday, unless, as has lately been the case in St. Olave's, the district board makes a complaint to the Board of Trade, and gets an inspector sent down. Then for a short time the poor got a few minutes supply on Sundays. He himself only has a supply six times a week for about a quarter of an hour a day, and this was not half as much as he required. He did hope the board would stand forth on behalf of the public at large. Liberal men had been crying out for lodger franchise and household franchise; let them now seek to obtain a water franchise, and urge upon the Government the necessity of granting it. There were so many restrictions in the companies private Acts, that until the control was transferred to a public body, the public never could have a proper supply. In the Southwark Act, water for domestic purposes did not include a supply for a bath, or water-closet, or to be used for any purpose of trade, or for gardening. Water for these things must be paid for separately. If a district board went to a company and said, "We want a supply for our water-carts," they could have it, because they paid largely for it; but the poor could not do so, and therefore they were deprived of a proper supply. Providence has given us a bountiful supply of this necessity of existence, and yet certain companies are allowed to interfere, and deal it out niggardly at so much a gallon. Mr. Greaves, in his evidence, spoke of a pipe with so small an orifice that it would only give a pint a minute, as affording a constant supply. Such a pipe would only give 180 gallons in 24 hours. What good would such a pipe be to a house with four or five families? He trusted the board would look at the matter with a broad and comprehensive view, and a desire to benefit those who want help. The rich who lived at the north and west of London were not in want of assistance—they could afford to pay for what they needed; but the poor people living in the mews behind their richer neighbours were obliged to put up with a mere dribble. Surely no liberal-minded wealthy man would wish his poor neighbours to suffer any longer than was absolutely necessary. Let them give their

votes for taking the control out of the hands of the water companies. Give them their pound of flesh; pay them for the concern; but the transfer must be a great gain to the public. If the companies continued to have the management, they would have to raise half a million or more in order to afford a better supply, and of course the public would have to pay the dividends on that capital. Would it not, then, be better for the public themselves to raise the money, and have all the benefit arising from it? He hoped the board would give up all idea of ever being able to get a constant supply from the companies. Of course no one contemplates having a tap on each floor of such houses as Mr. Richardson had alluded to. A stand pipe would be quite sufficient if the supply were constantly on. Difficulties in the way were only suggested by officers and others connected with the companies. They objected that pipes could not be made sufficiently secure, but gas-pipes were laid on all over the houses without any escape taking place, and in some buildings hot water was laid on to every room without any inconvenience. How, then, could it be said that a single pipe could not be laid on from top to bottom of a house, if required, with constant pressure? The objection was a monstrous one; but it was a part of their professional duty to make objections, and therefore they are compelled to have recourse to such.

Mr. FREEMAN said the subject had now been thoroughly exhausted, and therefore he had but very little to say in reply. Mr. Richardson had characterized the motion as a subtle one. He shuddered at the thought of suggesting to the Government and Parliament that the board should take the management of the water supply under their control. What a singular thing it was that such a feeling did not possess the honourable member when the question of the supply of gas was before the board. Surely gas was not more essential than water, and yet in the minutes of the board appeared a notice of motion that the board should go to Parliament and ask that the management of the supply of gas should be transferred to the board. Mr. Richardson was the leading person in urging that upon the board, and yet now he was opposed to a simple expression of approval of the general report of the Royal Commission, and was horrified lest the board were going to travel beyond their Acts of Parliament. Surely, if there ever was a man at the board inconsistent on this matter of applying to Parliament for new powers, it must be Mr. Richardson; for there could not be a greater contrast than between his views with regard to the water supply, and those with regard to the gas supply. He had tried to raise a battle between the chalk water and the river water, but all the motion did on this point was to express approval of the conclusion of the Royal Commission, that there was no necessity to go to Wales, or to the Lakes, but that in and about London there was an abundant supply of water. The board would never think of shackling the companies, or a municipality, as to their sources of supply. They might diminish the river supply and increase the chalk supply, as they thought desirable; but if Mr. Richardson, on the evidence of Mr. Morris, was willing to trust entirely to the supply from the chalk, he must be the most daring and speculative man he (Mr. Freeman) ever knew. Let both sources be kept, and as wisdom and experience suggested, either or both might be drawn from. Mr. Richardson was also shocked at the idea of the chairman going up to the Home Secretary with a resolution passed by a mere majority, but surely in a matter of perfect right he would be regardless of whether he was in the majority or in the minority, and would be ready to do battle for that which was good for the ratepayers. Yet, simply because he had a little crotchet about the supply from chalk, he recommended the board to do nothing, to stand still and hold their hands, and not have the moral courage to go to the Government and express their opinion. That opinion, as expressed in the motion, was that the board agreed with the report of the Royal Commission; and that on the whole, in the interest of the ratepayers, it was desirable that Government should carry that report into practical effect as soon as possible. He (Mr. Freeman) was convinced that if the Government thought fit to hand the control of the water supply over to the board, everything could be done at not one iota more cost than the ratepayers at present paid. Within the last week he had obtained the last return from some of the water companies, and if the board would appoint a small committee, he would prove to them that the whole thing could be transferred to a municipality without an increase of expenditure by the public. Surely a corporation devoted not to increasing its dividends, or making perfectly sure of 6 per cent., but to giving a pure water to enable the people to be cleanly, would do what was required cheaper than the companies. Mr. Richardson should have remembered that chalk water is hard, and would therefore to some extent deter people from using it, because it is not a comfortable thing to wash in hard water. Nobody would choose a hard water when a moderately soft one could be got. In one part of the evidence it was shown that the cost of continually washing a shirt in some hard water was fourteen times as much as it originally cost. He believed it would be a good and great thing for the metropolis to get the whole affair handed over to a municipality which would devote itself to obtaining an abundant supply of the very best water for this metropolis.

The amendment, on being put to the vote, found only one supporter, after which the original motion was carried by 21 against 10.

PROFESSOR TYNDALL "ON DUST AND DISEASE."

ROYAL INSTITUTION OF GREAT BRITAIN, FRIDAY, JAN. 21.

Solar light, in passing through a dark room, reveals its track by illuminating the dust floating in the air. "The sun," says Daniel Culverwell, "discovers atomes, though they be invisible by candlelight, and makes them dance naked in his beams." In my researches on the decomposition of vapours by light I was compelled to remove these "atomes" and this dust. It was essential that the space containing the vapours should embrace no visible thing; that no substance capable of scattering the light in the slightest sensible degree should at the outset of an experiment be found in the "experimental tube" traversed by the luminous beam. For a long time I was troubled by the appearance there of floating dust, which, though invisible in diffuse daylight, was at once revealed by a powerfully condensed beam. Two tubes were placed in succession in the path of the dust—the one containing fragments of glass wetted with concentrated sulphuric acid; the other, fragments of marble wetted with a strong solution of caustic potash. To my astonishment it passed through both. The air of the Royal Institution, sent through these tubes at a rate sufficiently slow to dry it and to remove its carbonic acid, carried into the experimental tube a considerable amount of mechanically suspended matter, which was illuminated when the beam passed through the tube. The effect was substantially the same when the air was permitted to bubble through the liquid acid and through the solution of potash. Thus, on the 5th of October, 1868, successive charges of air were admitted through the potash and sulphuric acid into the exhausted experimental tube. Prior to the admission of the air the tube was optically empty; it contained nothing competent to scatter the light. After the air had entered the tube the conical track of the electric beam was in all cases clearly revealed. This indeed was a daily observation at the time to which I now refer. I tried to intercept this floating matter in various ways; and on the day just mentioned, prior to sending the air through the drying apparatus, I carefully permitted it to pass over the tip of a spirit-lamp flame. The floating matter no longer appeared, having been burnt up by the flame. It was therefore organic matter. When the air was sent too rapidly through the flame, a fine blue cloud was found in the experimental tube. This was the smoke of the organic particles. I was by no means prepared for this result; for I had thought, with the rest of the world, that the dust of our air was, in great part, inorganic and non-combustible. Mr. Valentin had the kindness to procure for me a small gas furnace, containing a platinum tube, which could be heated to vivid redness. The tube also contained a roll of platinum gauze, which, while it permitted the air to pass through it, ensured the practical contact of the dust with the incandescent metal. The air of the laboratory was permitted to enter the experimental tube, sometimes through the cold and sometimes through the heated tube of platinum. The rapidity of admission was also varied. In the first column of the following table the quantity of air operated on is expressed by the number of inches which the mercury gauge of the air-pump sank when the air entered. In the second column the condition of the platinum tube is mentioned, and in the third the state of the air which entered the experimental tube:—

Quantity of Air.	State of Platinum Tube.	State of Experimental Tube.
15 inches	Cold	Full of particles.
15 "	Red hot	Optically empty.
15 "	Cold	Full of particles.
15 "	Red hot	Optically empty.
15 "	Cold	Full of particles.
15 "	Red hot	Optically empty.

The phrase "optically empty" shows that when the conditions of perfect combustion were present, the floating matter totally disappeared. It was wholly burnt up, leaving not a trace of residue. From spectrum analysis, however, we know that soda floats in the air; these organic dust particles are, I believe, the rafts that support it, and when they are removed it sinks and vanishes. When the passage of the air was so rapid as to render imperfect the combustion of the floating matter, instead of optical emptiness, a fine blue cloud made its appearance in the experimental tube. The following series of results illustrate this point:—

Quantity.	Platinum Tube.	Experimental Tube.
15 inches, slow	Cold	Full of particles.
15 " "	Red hot	Optically empty.
15 " quick	Red hot	A blue cloud.
15 " "	Intensely hot	A fine blue cloud.

The optical character of these clouds was totally different from that of the dust which produced them. At right angles to the illuminating beam they discharged perfectly polarized light. The cloud could be utterly quenched by a transparent Nichol's prism, and the tube containing it reduced to optical emptiness. The particles floating in the air of London being thus proved to be organic, I sought to burn them up at the focus of a concave reflector. One of the powerfully convergent mirrors employed in my experiments on combustion by dark rays was here made use of, but I failed in the attempt. Doubtless the floating particles are in part transparent to radiant heat, and are so far incombustible by such heat. Their rapid motion through the focus also aids their escape. They do not linger there sufficiently long to be consumed. A flame, it was evident, would burn them up, but I thought the presence of the flame would mask its own action among the particles. In a cylindrical beam, which powerfully illuminated the dust of the laboratory, was placed an ignited spirit-lamp. Mingling with the flame, and round its rim, were seen wreaths of darkness resembling an intensely black smoke. On lowering the flame below the beam the same dark masses stormed upwards. They were at times blacker than the blackest smoke I have ever seen issuing from the funnel of a steamer, and their resemblance to smoke was so perfect as to lead the most practised observer to conclude that the apparently pure flame of the alcohol-lamp required but a beam of sufficient intensity to reveal its clouds of liberated carbon. But is the blackness smoke? This question presented itself in a moment. A red-hot poker was placed underneath the beam, and from it the black wreaths also ascended. A large hydrogen flame was next employed, and it produced those whirling masses of darkness far more copiously than either the spirit-flame or poker. Smoke was, therefore, out of the question. What, then, was the blackness? It was simply that of stellar space; that is to say, blackness resulting from the absence from the track of the beam of all matter competent to scatter its light. When the flame was placed below the beam the floating matter was destroyed *in situ*, and the air, freed from this matter, rose into the beam, jostled aside the illuminated particles, and substituted for their light the darkness due to its own perfect transparency. Nothing could more forcibly illustrate the invisibility of the agent which renders all things visible. The beam crossed unseen the black chasm formed by the transparent air, while at both sides of the gap the thick-strewn particles shone out like a luminous solid under the powerful illumination. But here a difficulty meets us. It is not necessary to burn the particles to produce a stream of darkness. Without actual combustion currents may be generated which shall exclude the floating matter, and therefore appear dark amid the surrounding brightness. I noticed this effect first on placing a red-hot copper ball below the beam, and permitting it to remain there until its temperature had fallen below that of boiling water. The dark currents, though much enfeebled, were still produced. They may also be produced by a flask filled with hot water. To study this effect a platinum wire was stretched across the beam, the two ends of the wire being connected with the two poles of a voltaic battery. To regulate the strength of the current a rheostat was placed in the circuit. Beginning with a feeble current, the temperature of the wire was gradually augmented, but before it reached the heat of ignition a flat stream of air arose from it, which, when looked at edgeways, appeared darker and sharper than one of the blackest lines of Fraunhofer in the solar spectrum. Right and left of this dark vertical band the floating matter rose upwards, bounding definitely the non-luminous stream of air. What is the explanation? Simply this: The hot wire rarefied the air in contact with it, but it did not equally lighten the floating matter. The convection current of pure air, therefore, passed upwards among the particles, dragging them after it right and left, but forming between them an impassable black partition. In this way we render an account of the dark currents produced by bodies at a temperature below that of combustion. Oxygen, hydrogen, nitrogen, carbonic acid, so prepared as to exclude all floating particles, produce the darkness when poured or blown into the beam. Coal gas does the same. An ordinary glass shade placed in the air with its mouth downwards permits the track of the beam to be seen crossing it. Let coal gas or hydrogen enter the shade by a tube reaching to its top, the gas gradually fills the shade from the top downwards. As soon as it occupies the space crossed by the beam, the luminous track is instantly abolished. Lifting the shade so as to bring the common boundary of gas and air above the beam, the track flashes forth. After the shade is full, if it be inverted, the gas passes upwards like a black smoke among the illuminated particles. The air of our London rooms is loaded with this organic dust, nor is the country air free from its pollution. However ordinary daylight may permit it to disguise itself, a sufficiently powerful beam causes the air in which the dust is suspended to appear as a semi-solid rather than as a gas. Nobody could in the first instance without repugnance place the mouth at the illuminated focus of the electric beam and inhale the dirt revealed there. Nor is the disgust abolished by the reflection that, although we do not see the nastiness, we are churning it in our lungs every hour and minute of our lives. There is no respite to this contact with dirt; and the wonder is, not that we should from time to time suffer from its presence, but that so small a portion of it would appear to be deadly to man. And what is this portion? It was some time ago the current belief that epidemic diseases generally were propagated by a kind of malaria, which consisted of organic matter in a state of *motor-decay;* that when such matter was taken into the body, through the lungs or skin, it had the power of spreading there the destroying process which had attacked itself. Such a spreading power was visibly exerted in the case of yeast. A little leaven was seen to leaven the whole lump, a mere speck of matter in this supposed state of decomposition being apparently competent to propagate indefinitely its own decay. Why should not a bit of rotten malaria work in a similar manner within the human frame? In 1836 a very wonderful reply was given to this question. In that year Cagniard de la Tour

discovered the yeast plant, a living organism, which when placed in a proper medium feeds, grows, and reproduces itself, and in this way carries on the process which we name fermentation. Fermentation was thus proved to be a product of life instead of a process of decay. Schwann, of Berlin, discovered the yeast plant independently; and in February, 1837, he also announced the important result, that when a decoction of meat is effectually screened from ordinary air, and supplied solely with air which has been raised to a high temperature, putrefaction never sets in. Putrefaction, therefore, he affirmed to be caused by something derived from the air, which something could be destroyed by a sufficiently high temperature. The experiments of Schwann were repeated and confirmed by Helmholtz and Ure. But as regards fermentation, the minds of chemists, influenced probably by the great authority of Gay-Lussac, who ascribed putrefaction to the action of oxygen, fell back upon the old notion of matter in a state of decay. It was not the living yeast plant, but the dead or dying parts of it, which, assailed by oxygen, produced the fermentation. This notion was finally exploded by Pasteur. He proved that the so-called "ferments" are not such; that the true ferments are organized beings which find in the reputed ferments their necessary food. Side by side with these researches and discoveries, and fortified by them and others, has run the germ theory of epidemic disease. The notion was expressed by Kircher, and favoured by Linnæus, that epidemic diseases are due to germs which float in the atmosphere, enter the body, and produce disturbance by the development within the body of parasitic life. While it was still struggling against great odds, this theory found an expounder and defender in the president of this institution. At a time when most of his medical brethren considered it a wild dream, Sir Henry Holland contended that some form of the germ theory was probably true. The strength of this theory consists in the perfect parallelism of the phenomena of contagious disease with those of life. As a planted acorn gives birth to an oak competent to produce a whole crop of acorns, each gifted with the power of reproducing its parent tree, and as thus from a single seedling a whole forest may spring, so these epidemic diseases literally plant their seeds, grow, and shake abroad new germs, which, meeting in the human body their proper food and temperature, finally take possession of whole populations. Thus Asiatic cholera, beginning in a small way in the Delta of the Ganges, contrived in 17 years to spread itself over nearly the whole habitable world. The development from an infinitesimal speck of the virus of small-pox of a crop of pustules, each charged with the original poison, is another illustration. The reappearance of the scourge, as in the case of the *Dreadnought* at Greenwich, reported on so ably by Dr. Budd and Mr. Busk, receives a satisfactory explanation from the theory which ascribes it to the lingering of germs about the infected place. Surgeons have long known the danger of permitting air to enter an opened abscess. To prevent its entrance they employ a tube called a cannula, to which is attached a sharp steel point called a trocar. They puncture with the steel point, and by gentle pressure they force the pus through the cannula. It is necessary to be very careful in cleansing the instrument; and it is difficult to see how it can be cleansed by ordinary methods in air loaded with organic impurities, as we have proved our air to be. The instrument ought, in fact, to be made as hot as its temper will bear. But this is not done, and hence, notwithstanding all the surgeon's care, inflammation often sets in after the first operation, rendering necessary a second and a third. Rapid putrefaction is found to accompany this new inflammation. The pus, moreover, which was sweet at first, and showed no trace of animal life, is now fetid, and swarming with active little organisms called vibrios. Professor Lister, from whose recent letter this fact is derived, contends, with every show of reason, that this rapid putrefaction and this astounding development of animal life are due to the entry of germs into the abscess during the first operation, and their subsequent nurture and development under favourable conditions of food and temperature. The celebrated physiologist and physicist Helmholtz is attacked annually by hay fever. From the 20th of May to the end of June he suffers from a catarrh of the upper air-passages; and he has found during this period, and at no other, that his nasal secretions are peopled by these vibrios. They appear to nestle by preference in the cavities and recesses of the nose, for a strong sneeze is necessary to dislodge them. These statements sound uncomfortable, but by disclosing our enemy they enable us to fight him. When he clearly eyes his quarry, the eagle's strength is doubled, and his swoop is rendered sure. If the germ theory be proved true, it will give a definiteness to our efforts to stamp out disease which they could not previously possess. And it is only by definite effort under its guidance that its truth or falsehood can be established. It is difficult for an outsider like myself to read without sympathetic emotion such papers as those of Dr. Budd, of Bristol, on cholera, scarlet fever, and small-pox. He is a man of strong imagination, and may occasionally take a flight beyond his facts; but without this dynamic heat of heart the stolid inertia of the free-born Briton cannot be overcome. And as long as the heat is employed to warm up the truth without singeing it over much—as long as this enthusiasm can overmatch its mistakes by unequivocal examples of success—so long am I disposed to give it a fair field to work in, and to wish it God speed. But let us return to our dust. It is needless to remark that it cannot be blown away by an ordinary bellows, or, more correctly, the place of the particles blown away is in this case supplied by others ejected from the bellows, so that the track of the beam remains unimpaired; but if the nozzle of a good bellows be filled with cotton wool, not too tightly packed, the air urged through the wool is filtered of its floating matter, and it then forms a clean band of darkness in the illuminated dust. This was the filter used by Schroeder in his experiments on spontaneous generation, and turned subsequently to account in the excellent researches of Pasteur. Since 1868 I have constantly employed it myself. But by far the most interesting and important illustration of this filtering process is furnished by the human breath. I fill my lungs with ordinary air, and breathe through a glass tube across the electric beam. The condensation of the aqueous vapour of the breath is shown by the formation of a luminous white cloud of delicate texture. It is necessary to abolish this cloud, and this may be done by drying the breath previous to its entering the beam; or, still more simply, by warming the glass tube. When this is done the luminous track of the beam is for a time uninterrupted. The breath impresses upon the floating matter a transverse motion, but the dust from the lungs makes good the particles displaced. But after some time an obscure disc appears upon the beam, the darkness of which increases, until finally, towards the end of the expiration, the beam is, as it were, pierced by an intensely black hole, in which no particles whatever can be discerned. The air, in fact, has so lodged its dirt within the lungs as to render the last portions of the expired breath absolutely free from suspended matter. This experiment may be repeated any number of times with the same result. It renders the distribution of the dirt within the lungs as manifest as if the chest were transparent. I now empty my lungs as perfectly as possible, and placing a handful of cotton wool against my mouth and nostrils, inhale through it. There is no difficulty in thus filling the lungs with air. On expiring this air through the glass tube, its freedom from floating matter is at once manifest. From the very beginning of the act of expiration the beam is pierced by a black aperture. The first puff from the lungs abolishes the illuminated dust, and puts a patch of darkness it its place; and the darkness continues throughout the entire course of the expiration. When the tube is placed below the beam and moved to and fro, the same smoke-like appearance as that obtained with a flame is observed. In short, the cotton wool, when used in sufficient quantity, completely intercepts the floating matter on its way to the lungs. And here we have revealed to us the true philosophy of a practice followed by medical men, perhaps more from instinct than from actual knowledge. In a contagious atmosphere the physician places a handkerchief to his mouth and inhales through it. In doing so he unconsciously holds back the germs of the air. If the poison were a gas, it could not be thus intercepted. On showing this experiment with the cotton wool to Dr. Bence Jones, he immediately repeated it with a silk handkerchief. The result was substantially the same, though, as might be expected, the wool is by far the surest filter. The application of these experiments is obvious. If a physician wishes to hold back from the lungs of his patient, or from his own, the germs by which contagious disease is said to be propagated, he will employ a cotton wool respirator. After the revelations of this evening such respirators must, I think, come into general use as a defence against contagion. In the crowded dwellings of the London poor, where the isolation of the sick is difficult, if not impossible, the noxious air around the patient may by this simple means be restored to practical purity. Thus filtered, attendants may breathe the air unarmed. In all probability the protection of the lungs will be the protection of the entire system. For it is exceedingly probable that the germs which lodge in the air-passages, and which, at their leisure, can work their way across the mucous membrane, are those which sow in the body epidemic disease. If this be so, then disease can certainly be warded off by filters of cotton wool. I should be most willing to test their efficacy in my own person; and time will decide whether in lung diseases also the woollen respirator cannot abate irritation, if not arrest decay. By its means, so far as the germs are concerned, the air of the highest Alps may be brought into the chamber of the invalid.

THE WATER SUPPLY OF PARIS.

The great reservoir of Ménilmontant, which has been for a considerable time in use, the new reservoir now being completed at Montrouge, and the canal and the water-works of the Marne, have been described in the *Engineer*. But the water service of a large city like Paris is a matter of great interest and importance, and therefore we present our readers with the following particulars of what has been done, or is now in hand, for the supply of our neighbours with a sufficient quantity of water. Paris presents some facilities, but more difficulties, as regards water supply. The city is surrounded by heights which present good positions for the establishment of reservoirs; but the sources of supply at hand are insufficient, and good water is a long way off. The water brought by certain canals is not potable, so that it has been necessary to make separate arrangements for the supply of the inhabitants and the watering of roads and irrigation of the parks and public gardens.

The supplies are obtained partly from rivers and partly from springs. The former are supplied by the Canal de l'Ourcq, which yields 105,000 tons; steam-pumps on the Seine at Port à l'Anglais, 6000 tons; ditto at Maison Alford, 8000 tons; ditto at Quai d'Austerlitz, 22,000 tons; ditto at Chaillot, 38,000 tons; ditto at Auteuil, 3000 tons; Neuilly, 5000 tons; St. Ouen, 6000 tons; the hydraulic works of St. Maur, 15,000 tons; giving a total of 208,000 tons.

Practically, however, this supply is greatly reduced by various causes, such as drought (which causes that of the Canal de l'Ourcq to fall to 95,000 tons), repair of the machinery, &c.; so that the average that can be counted on safely is not more than 170,000 tons. Lately, however, the supply of the St. Maur works has been raised to 46,000 tons, so that an approximative total of about 200,000 tons has been reached. The spring water is derived from Arcueil, which yields 1000 tons; the artesian well of Grenelle, 600 tons; the artesian well of Passy, 8000 tons. In addition to these the waters of the Dhuis, which recently supplied 24,000 tons, have lately been increased to 49,000 tons by the construction of secondary aqueducts.

The distribution of these various supplies is as follows:—The waters of the Ourcq serve five arrondissements in the centre of Paris, and the lower portions of ten other departments, as well as a part of the Bois de Boulogne. The waters of the Dhuis are reserved for the private service of three arrondissements in the outer circle of the city, and of the higher portions of four other arrondissements. The water-works of St. Maur supply the Bois de Vincennes. The water of the Seine, raised by the pumps at Chaillot, supplies the Tuileries, the houses of the ministers, the hospitals, the higher portions of old Paris, and a large part of the outlying districts on high ground. The other water-works serve their respective districts.

The Passy artesian well supplies the Bois de Boulogne; the water is hot, and loaded with sulphuretted hydrogen, like that of Harrowgate. The waters of Arcueil and of the artesian well of Grenelle are used to supplement the waters of the Seine.

At present the outlying quarters of the city—those which were but recently taken within its limits—are the best supplied with water; nearly all that of the Dhuis, besides that of the Seine, taken above the city, being reserved for this purpose, while the central and older parts of Paris are scarcely better off than they were in 1856, when the distribution only amounted to 80,000 tons. This latter fact has its origin in a variety of causes. In the first place, since 1857 the drought has been greater than ever occurred during the 17th, 18th, and 19th centuries; many sources have been completely dried up, and the yield from others has been diminished in an extraordinary degree. As regards the Seine, the conduit-pipe of the water-works at Chaillot, which was established according to low-water mark in 1719, became quite uncovered towards the end of 1865, and the city was deprived at once by that occurrence of 38,000 tons of water per day, and that not only at the driest part of the year, but when a terrible epidemic demanded a double supply for the purpose of cleansing the streets. So large a deficit rendered it impossible to flood the gutters or water the streets, while the refuse lay stagnant in the sewers for want of current; the fountains and hydrants were without water during the summer, and Montmartre, Belleville, and Ménilmontant were short of water all the season. The terror caused by the presence of the cholera under such circumstances gave the necessary impetus for ensuring the increased supply of water to the capital. Moreover, the number of the inhabitants of Paris is not only increasing every day, but new parks, gardens, and squares are growing up, and will require more water. Lastly, there are 3000 hydrants in the streets which are closed during the summer for want of water.

The quantity of water required for the future supply of Paris is set down at 420,000 tons per day, and the works now under hand are intended to bring it up to that figure. Of this total, 250,000 tons are required for the public service, watering roads, streets, paths, and grass, flooding gutters, sewers, &c., for which purpose no special quality of water is required. Of the remaining 170,000 tons, 40,000 are required for manufactories, and this may be taken from the Seine and the Marne, which falls into the former just above the city.

The 130,000 tons thus left for domestic use should be water having special qualities. The waters of the Ourcq and of the Marne are too hard, and anything but agreeable to the palate; the water of the Seine is frequently muddy, besides being too warm in summer and too cold in winter. Spring water alone furnishes the necessary conditions, and this is the reason for bringing the waters of the Dhuis and the Vaune to Paris.

The Dhuis water arrives in the reservoir of Ménilmontant at Paris at an altitude of 354 feet, and a portion of it is then pumped up into the reservoir at Belleville, 436 feet high, for the supply of the high grounds of Montmartre, Belleville, and Ménilmontant. The Vaune waters will be received in large reservoirs having an altitude of 244 feet.

Of the 59,000 houses and manufacturing establishments now existing in Paris, about 26,500 pay for water laid on to the premises, leaving 22,500 to be so supplied. The former consume at present 80,000 tons. When all are supplied, taking 2,000,000 of inhabitants, which the city is fast approaching, as a basis, each house, on an average, will receive more than 17 gallons of water per diem, or 26 tons per annum, at an expense of 4s. a year, or less than one ton of filtered water purchased of the water carriers, as is still the practice in all the houses to which water is not yet laid on. Ten francs a month is, under the latter circumstances, a moderate sum for a family to pay for water.

Under these considerations of the present and future wants of Paris, the municipal authorities caused a careful examination to be made of the means of supply, the result of which was the choice of the source of the Vaune, with its tributaries, for the completion of the supply of the city. The Vaune is a small stream which takes its rise in the department of the Aube, at Fontvaune, so named from the source, near Estissac, on the edge of the chalky plains of Champagne, and about eight miles from Troyes. Its direction is from east to west, and it receives seven tributary sources before it falls into the Yonne just above the town of Sens. One of the reasons why the choice fell upon the Vaune was the remarkable constancy of its stream. Its basin, which is equal to nearly 1000 square kilomètres, is entirely formed in the white chalk, but the plateaux are crowned with tertiary strata, formed generally of red mud mixed with loose stones. The plateaux are broken up, and the chalky slopes are bare, as is usual in Champagne. The valley is large and flat, and composed of very wet marshy land. The water is remarkably limpid. The Dhuis was far from presenting such advantageous conditions. Its sources were originally invaded by torrents, and cost much labour to preserve.

All the sources of the valley of the Vaune have been purchased by the city of Paris. They amount in all to thirteen, and are all on the left bank of the stream. Besides the sources, the city had to buy the factories and establishments most injured by the taking of the water. The first source is that of Cerilly, or Bûne. It springs out of the ground at an altitude of 460 feet, and its waters are so limpid that the bottom is clearly seen in a deep gulf. The water of the other sources is of equally good quality. The altitudes of the nine sources vary from that already given to about 290 feet. The water of all these sources will have to be lifted by machinery into the main aqueduct.

It has already been stated that the water of the Seine is too warm in summer and too cold in winter; and water, when too cold, not only gives rise to interruption in the service by freezing in the pipes, but may be the cause of grave disorders and inconvenience. The experience of ten years has proved that the Arcueil has an average temperature of from 50° to 54°; during the great heats the Dhuis water arrives in Paris at a temperature of about 56°. The waters of the Vaune will arrive in Paris completely aërated by an aqueduct open to the air throughout an extent of about 90 miles.

The water of the Seine will eventually only be used for manufacturing purposes, the quantity of organic matter in that river being too large to render the water fit for domestic purposes.

The works of the aqueduct present many features of importance. In the first place, each of the upper sources has to be conveyed by means of a secondary aqueduct to the main one. Between Thiel and Malhortie the aqueduct is carried on arches over the valley. From the latter place the line follows the chalky slopes of the right bank of the stream, passes to the right of the town of Sens, and enters the valley of the Yonne, skirting its right flank to a little below a place called Pont-sur-Yonne. Thence it is carried across the valley by means of a great syphon, and is continued to Moret, on the slopes of the Seine, without any serious difficulties. It then crosses the valley of the Loing, and enters the forest of Fontainebleau.

Here the most serious difficulties arise, on account of the composition of the soil, which is formed of sand, lying higher than the plateau composed of the argillaceous millstone which stretches thence to Paris. It was necessary to cut deep trenches and to form tunnels, one of which is very long; fortunately, however, there is no water here, or the work would have been almost impossible. After quiting the forest the aqueduct starts the sandy hills, crosses the valley of Ecolle, and at Champteuil touches the argillaceous plateau, which it follows till it reaches Paris. Passing over the rivers Essonne and Orge, the aqueduct enters the valley of the Bièvre, and reaches Paris at the plateau of Montrouge, near the Orleans Road, after a course of 89 miles.

The aqueduct is calculated to yield at least 258 gallons per second, its maximum being 324 gallons. The cost of the work will be about £1,160,000.

The reservoir is constructed in two stages; one of these, with an average depth of 11 feet 8 inches of water, will contain about 123,000 tons, with a maximum altitude of 262 feet; the second, with a depth of 18 feet, will hold 182,000 tons, with a maximum altitude of 248 feet. Four conduits will carry the water from the aqueduct; two of these, 32 inches in diameter, will supply the upper, and the other two, 43 inches in diameter, the lower reservoir. The cost of this double reservoir is stated to be about £200,000. The whole cost, therefore, of bringing the waters of the Vaune to the edge of Paris ready to be turned into the mains will be about £1,360,000, and it would be difficult to find an instance of money better employed.

Like the works of the Dhuis and the reservoir of Ménilmontant, the aqueduct of the Vaune and the reservoir of Monssouris, or Montrouge, are carried on under the direction of M. Belgrand, Engineer-in-Chief of Ponts and Chaussées, and inspector-general of the water and sewers of the city of Paris.—*The Engineer.*

DR. WHITMORE'S REPORT ON THE QUALITY OF THE WATER SUPPLIED IN ST. MARYLEBONE, IN JANUARY, 1870:—

JANUARY, 1870.	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by Incineration of Solid Matter in previous column.		Ammonia.
	Jan., 1869. 0°	Jan., 1870. 0°	Jan., 1869. 0°	Jan., 1870. 0°	0°
Distilled Water . . .					
West Middlesex water .	19·16	20·92	·80	·84	—
Grand Junction water .	20·16	20·12	·96	·96	—

* The loss by incineration represents the amount of organic and other volatile matters contained in an Imperial gallon (70,000 grains) of water.

DR. WHITMORE'S REPORT ON THE QUALITY OF THE GAS SUPPLIED IN ST. MARYLEBONE, IN JANUARY, 1870:—

JANUARY, 1870.	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quantity of Sulphur in 100 Cub. Ft.	Mean Quantity of Ammonia in 100 Cub. Ft.	Sulphuretted Hydrogen.
	*Mean of 25 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Imperial Company's gas . . .	16·48	17·02	15·65	29·48	10·48	32·54	0·59	None.
Chartered Company's common gas	16·08	16·49	15·57	39·62	13·81	38·84	1·89	None.
Chartered Company's cannel gas	22·53	23·51	21·72	36·53	12·87	32·56	1·42	None.

Mean of daily readings of Barometer . . . 29·75
" " " Thermometer . . 49·77

* Each observation consists of 10 readings of the photometer, at intervals of one minute.

During the month the Imperial Company's gas gave a mean illuminating power equal to 16·48 candles, and ranged from 15·65 to 17·02 candles; the mean quantity of sulphur found in 100 cubic feet of this gas was 32·54 grains, whilst the ammonia but slightly exceeded half a grain. The common gas of the Chartered Company gave a mean light equal to 16·08 candles; the range was from 15·57 to 16·49 candles. This gas contained also a large amount of sulphur, the mean being 38·84 grains in 100 cubic feet. The mean light of the cannel gas was 22·58 candles, and ranged from 21·72 to 23·51 candles. The mean quantity of sulphur in 100 cubic feet was 32·56 grains, whilst the ammonia amounted to only 1·42 grains. On no occasion was sulphuretted hydrogen detected in either of the three gases. The pressure of all was uniformly satisfactory. The above results were obtained from the gas manufactured by the Imperial Company at their Fulham works, and from the Chartered Company's gas, manufactured at their works, Horseferry Road, Westminster.

AVERAGE COMPOSITION AND QUALITY OF THE METROPOLITAN WATERS IN THE YEAR 1869.—The following are the returns of the Metropolitan Association of Medical Officers of Health:—

Names of Water Companies.	Total Solid Matter per Gal.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
	Grs.	Grs.	Grs.	Grs.	Deg.	Deg.
Thames Water Cos.						
Grand Junction . .	19·78	0·089	0·112	0·002	14·3	3·7
West Middlesex . .	18·83	0·079	0·116	0·001	13·9	3·6
Southwark & Vauxhall	19·52	0·097	0·113	0·002	14·3	3·7
Chelsea	19·23	0·101	0·139	0·003	14·2	3·8
Lambeth	18·84	0·085	0·169	0·002	13·9	3·6
Other Companies.						
Kent	27·85	0·031	0·200	0·001	20·2	5·9
New River	18·80	0·042	0·113	0·001	14·1	3·5
East London . . .	19·93	0·066	0·139	0·001	14·5	3·8

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water supplied by the following companies—namely, the New River, the East London, and the West Middlesex, has always been bright and colourless; but that of the Grand Junction was turbid on one occasion, the Southwark and Vauxhall on two occasions, the Lambeth on four occasions, and the Chelsea on six. The chemical composition of the water has not fluctuated to any considerable extent from the average, the water derived from the Thames and the Lea having had the maximum amounts (from 21 to 23 grains per gallon) in the winter months, and the minimum amounts (from 17 to 17·5 grains per gallon) in the summer months. The quantity of water supplied daily to the metropolis during the year has ranged from 91,578,341 gallons in the month of January, to 110,094,058 in the month of July; the average for the whole year being, as nearly as possible, 92 millions of gallons daily; and the average number of houses supplied has been 466,100. This is at the average rate of 29 gallons per head of the population daily. About half of the supply is from the Thames, and the rest is from the river Lea and from springs and wells in the chalk. According to the official returns from the Prefect of the Seine, the average daily supply of water to Paris during the year has been 46,858,900 gallons, which is at the rate of 24·8 gallons per head of the population; but this includes the supply to the public fountains, and to the ornamental waters in the Bois de Vincennes, the Bois de Boulogne, and elsewhere. The water is derived from the Seine, the Marne, the Canal de l'Ourcq, and from artesian wells and springs in the chalk. None of the river water is filtered, and it is always turbid.

H. LETHEBY, M.B.

AVERAGE COMPOSITION AND QUALITY OF THE METROPOLITAN WATERS IN JANUARY, 1870.—The following are the returns of the Metropolitan Association of Medical Officers of Health:—

NAMES OF WATER COMPANIES.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Thames Water Comps.						
Grand Junction	20·03	0·113	0·066	0·002	15·0	4·6
West Middlesex	20·57	0·117	0·066	0·001	14·8	4·2
Southwark and Vauxhall . .	19·87	0·133	0·050	0·004	15·0	4·3
Chelsea	21·43	0·102	0·066	0·002	15·5	5·0
Lambeth	19·90	0·102	0·078	0·003	14·8	4·4
Other Companies.						
Kent	28·07	0·011	0·129	0·000	20·0	6·0
New River	20·53	0·059	0·075	0·002	14·9	4·1
East London	21·83	0·106	0·091	0·002	15·2	4·1

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and, in the case of the metropolitan waters, the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases but the following, when it was more or less turbid, namely:—The Chelsea Company and the Lambeth and Vauxhall Company. The average quantity of water supplied daily to the metropolis in the preceding month was, according to the returns of the water companies to the Association of Medical Officers of Health, 93,650,519 gallons, and the number of houses supplied was 474,010. This is at the rate of 29·5 gallons per head of the population daily. The last official return from Paris stated that the average daily supply per head of the population was 27·7 gallons; but this includes the water used for the public fountains, and for the ornamental waters in the Bois de Vincennes and the Bois de Boulogne.

H. LETHEBY, M.B.

DR. FRANKLAND'S ANALYSIS OF THE METROPOLITAN WATERS IN JANUARY, 1870.—"Royal College of Chemistry, Jan. 24, 1870.—Sir, I have the honour to submit to you in the following table the results of the chemical examination of the waters supplied to the metropolis during the month of January. For the purpose of comparison, I append also the results yielded by Thames water taken at London Bridge at low water on the 8th of December last. The floods in the Thames and Lea have brought these rivers to their maximum degree of winter pollution, and the resources of the water companies are strained to the utmost to deliver to their customers a supply which shall not be obviously repulsive. In these efforts, the West Middlesex and New River Companies alone have been completely successful. The Kent Company, which derives its supply from deep wells in the chalk, has not to contend with these annually recurring difficulties caused by winter floods. With but very rare exceptions, the water delivered by this company is, at all seasons, perfectly clear and transparent. Of the com-

panies drawing from the Thames, the West Middlesex alone delivered clear, that is efficiently filtered, water. The Chelsea and Lambeth Companies, who take their supply at a point below the junction of the muddy Mole with the Thames, supplied water of such a degree of turbidity as to render it entirely unfit for domestic use without previous filtration. The water delivered by the Southwark and Grand Junction Companies was slightly turbid. Living organisms were found in the suspended matter of the Chelsea, Southwark, and Grand Junction waters. Of the waters obtained from other sources, those delivered by the New River and Kent Companies were perfectly clear and transparent, whilst that supplied by the East London Company was very turbid, owing to the presence of much suspended brown matter full of living organisms. Amongst the latter vibrios were found. This is the first occasion, since I have examined the London waters microscopically, that these organisms, which are abundant in putrid sewage, have been met with in these waters. The organic carbon, organic nitrogen, and previous sewage or animal contamination in the East London Company's water are much higher than usual, the latter exceeding considerably that of any other water supplied to London. In consequence of the unsatisfactory condition of this water, I collected a second sample on the 19th inst. This sample is perfectly clear and transparent, but in other respects, so far as the analysis has proceeded, the matters in solution are present in substantially the same proportions. During the temporary stoppage of the main drainage at Abbey Mills, a careful supervision of all underground storeage reservoirs in the district will doubtless be exercised, lest any overflow or soakage of sewage should gain access to them. The water supplied by the Kent Company contained the smallest proportion of unoxidized organic elements.

Companies.	Date and Place of Collection.	Temperature in Centigrade Degrees.	Total Solid Impurity.	Organic Carbon.	Organic Nitrogen.	Ammonia.	Nitrogen, as Nitrates and Nitrites.	Total combined Nitrogen.	Previous Sewage or Animal Contam. (Estimated).	Chlorine.	Total Hardness.
Thames.											
Chelsea.....	Jan. 10—Cab Rk., Horse Guards.	7·8	29·2	·407	·039	·001	·355	·395	3240	1·75	20·02
West Middlesex	Jan. 10—Cab Rk., Portland Road.	7·5	30·0	·317	·039	·001	·385	·416	3540	1·80	22·32
Southwark & Vauxhall..	Jan. 10—Cab Rk., St. George's Ch.	8·3	31·26	·384	·036	·001	·354	·391	3230	1·82	22·04
Grand Junction.....	Jan. 10—Cab Rk., Woodstock St..	6·9	31·20	·385	·036	·000	·372	·408	3400	1·70	22·04
Lambeth....	Jan. 10—Cab Rk., Lambeth Road.	7·5	28·94	·390	·049	·001	·364	·414	3330	1·78	19·47
Other Sources											
New River...	Jan. 10—Cab Rk., Totnhm. Ct. Rd.	7·2	30·58	·215	·020	·000	·388	·408	3560	1·50	24·96
East London.	Jan. 10—Slater's, Old Ford Road.	8·9	34·52	·331	·039	·000	·479	·518	4470	1·90	25·84
Kent.....	Jan. 10—Deptford Bdge. Police Sta.	8·1	38·86	·065	·013	·000	·426	·439	3940	2·30	29·95
Thameswater filtered....	Decembr. 8, 1869—London Bridge, mid-stream, at low water		34·3	·558	·085	·103	·351	·521	4040	2·6	25·25
Column 1	2	3	4	5	6	7	8	9	10	11	12

The numbers in columns 4, 5, 6, 7, 8, 9, 10, 11, and 12 all relate to 100,000 parts of the waters. The table is to be read thus: The Chelsea Company's water collected on the 10th of January, at the Horse Guards cab rank, had a temperature of 7·8° Cent.; 100,000 lbs. of it contained 29·2 lbs. of solid impurity; the organic matter, constituting a portion of this impurity, contained ·407 lb. of carbon and ·039 lb. of nitrogen. This solid impurity also contained ·355 lb. of nitrogen in the form of nitrates and nitrites, besides ·001 lb. of ammonia, whilst the total amount of *combined* nitrogen in every form was ·395 lb. The above quantity of water supplied by the Chelsea Company had been, after its descent to the earth as rain, contaminated with sewage or animal matter equivalent to 3240 lbs. of average filtered London sewage. By gradual oxidation, partly in the pores of the soil, partly in the Thames and its tributaries, and partly in the reservoirs, filters, and conduits of the company, this sewage or animal contamination had been converted into innocuous inorganic compounds before its delivery to consumers. The above quantity of water also contained 1·75 lb. of chlorine. Finally, 100,000 lbs. of the Chelsea Company's water contained 20·02 lbs. of carbonate of lime, or an equivalent quantity of other soap-destroying ingredients.—I have, &c.,

"E. FRANKLAND.

"The Registrar-General, &c."

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

253.—JOHN RICKETTS, of Liverpool, in the co. of Lancaster, accountant, for "*Improvements in taps or cocks.*" Jan. 28, 1870.

259.—EDMUND SMALL CATHELS, of Aberdalgie Lodge, Lower Sydenham, Kent, gas engineer, and DAVID TERRACE, of 77, Mortimer Road, De Beauvoir Town, Middlesex, mechanical engineer, for "*Improvements in apparatus used in the manufacture of gas.*" (Complete specification.) Jan. 28, 1870.

285.—ALBERT WERKMEISTER, of Berlin, in the kingdom of Prussia, manufacturer, for "*An universal liquid-meter.*" Jan. 31, 1870.

315.—JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, in the co. of Middlesex, gentleman, for "*Improvements in gas and other pressure regulators.*" A communication. Feb. 3, 1870.

340.—HEINRICH WITTÖFT, of Copenhagen, in the kingdom of Denmark, for "*Improvements in gas-burners.*" Feb. 5, 1870.

364.—GEORGE WILLIAM WIGNER, of 1, St. Swithin's Lane, in the City of London, analytical chemist, for "*Improvements in the mode of and apparatus for treating and purifying sewage.*" Feb. 8, 1870.

368.—ANDREW AINSLIE COMMON, of South Bank, Regent's Park, in the co. of Middlesex, engineer, for "*Improvements in apparatus for regulating the supply of water to water-closets, and wherever a regulated supply may be required.*" Feb. 8, 1870.

393.—JAMES THOMSON, of 18, Whittington Road, Peckham, and WILLIAM THOMSON, of 22, Carlton Square, Peckham, for "*Improvements in ventilation of chimneys and apartments.*" Feb. 10, 1870.

GRANTS OF PROVISIONAL PROTECTION.

113.—GEORGE THORNELOE, of 34, London Wall, in the City of London, gas engineer, for "*A new flexible valve for regulating the flow of fluids in pipes, also used in apparatus for the manufacture of gas.*" Jan. 13, 1870.

143.—THEODORE BYRON HUBBELL, of Kentish Town, in the co. of Middlesex, for "*A novel arrangement and construction of gas-burner.*" A communication. Jan. 18, 1870.

200.—WILLIAM HENRY BERRY, engineer, GEORGE JOWETT, mechanic, and JAMES WOOD, manager, all of Sowerby Bridge, in the co. of York, for "*Improvements in water or other liquid or fluid meters.*" Jan. 22, 1870.

227.—JOHN STRAIN, of Neilston, in the co. of Renfrew, N.B., civil engineer, for "*Improvements in pipe-joints.*" Jan. 25, 1870.

228.—CROMWELL FLEETWOOD VARLEY, of Beckenham, in the co. of Kent, and THEODORE ANTHONY ROCHUSSEN, of Abchurch Lane, in the City of London, for "*Improvements in producing heat and light.*" Jan. 25, 1870.

INVENTION PROTECTED FOR SIX MONTHS ON THE DEPOSIT OF A COMPLETE SPECIFICATION.

259.—EDMUND SMALL CATHELS, of Aberdalgie Lodge, Lower Sydenham, Kent, gas engineer, and DAVID TERRACE, of 77, Mortimer Road, De Beauvoir Town, Middlesex, mechanical engineer, for "*Improvements in apparatus used in the manufacture of gas.*" Jan. 28, 1870.

NOTICES TO PROCEED.

2752.—ROBERT RENTON GIBBS, of Liverpool, in the co. of Lancaster, engineer, for "*Improvements in pumps, vacuum-pumps, and blast-engines, and in lubricators for the same, which are also applicable to other lubricating purposes.*" Sept. 22, 1869.

2814.—WILLIAM CHAMBERS, of the United University Club, Suffolk Street, in the co. of Middlesex, gentleman, for "*An improved method of and means for ventilating.*" Sept. 28, 1869.

THE

DUKE OF HAMILTON'S

LESMAHAGOW

CANNEL COAL.

LESSEES:

THE NITSHILL & LESMAHAGOW COAL COMPANY.

OFFICE:

37, ST. VINCENT PLACE,

GLASGOW,

Where all communications are requested to be addressed.

D. BRUCE PEEBLES,

ENGINEER,

FOUNTAINBRIDGE WORKS, EDINBURGH,

PATENTEE AND MANUFACTURER OF THE

NEW TONGUE & GROOVE JOINTED

WET AND DRY GAS-METERS IN TIN-PLATE CASES,

Being the only Meters yet made of Tin-Plate in which Screws are used for the whole of the jointing instead of Solder.

Gas Engineers who have not yet seen these Meters are solicited to give a trial order, and personally to take one of them to pieces and refit it, as being the short and easy way of assuring themselves of the strength and excellence of the materials, the superiority of the workmanship, and, above all, the simplicity of construction and efficient method of jointing employed.

Strength and lightness combined, with ready access to all the working parts for cleaning or repairs, which may be done by any ordinary workman, render these Meters, wet or dry, well worth the attention of Foreign Gas Companies.

Wet Meters in Cast-Iron Cases, Station-Meters, Governors, Experimenting Meters, &c.

PRICE LISTS ON APPLICATION.

WANTED, by a young Man, a situation as SUPERINTENDENT of a Gas-Work, where the annual make is about 10,000,000 cubic feet, or as ASSISTANT in a larger work. Has served the last two years in a similar capacity, and the preceding two as Accountant, Collector, and Meter Inspector. Good references, testimonials, and security if required.
Address A. B., Post-Office, Halstead, ESSEX.

WANTED, a Secretary for the Bognor Gas Company. It will be necessary that he should be capable of taking indices and keeping books, and possess a general knowledge of the management of Gas-Works.
Apply by letter, addressed to the CHAIRMAN at the Works.

GAS MANAGER WANTED.

WANTED, for the Midleton Gas Works, a steady, experienced MANAGER to take charge of the works. He must understand his business thoroughly in all its branches—gas-making, fitting, repairing meters, &c.; and his character bear investigation. Salary 30s. a week, and a house.
Apply, with copies of testimonials and references, to M. GREENE, Esq., Secretary of the Midleton Gas Company, Limited, Midleton, Co. CORK.

WANTED, by the Directors of the Rochester, Chatham, and Strood Gaslight Company, a FOREMAN or WORKING MANAGER for their Gillingham Station. He must be thoroughly competent to take entire charge of the carbonizing department, and to superintend the sale of coke, &c., and the necessary accounts of the station. He must also be conversant with the photometric and other testing of gas. He will be required to enter into a bond, with two sureties in the sum of £100, for the faithful performance of his duties. Salary £90 per year, payable monthly, with residence on the works, rent, rates, and taxes, coals, and gas free.
Applications (by letter only), enclosing testimonials, and marked "Application for Foreman," to be sent on or before Wednesday, the 23rd of February inst., to WILLIAM SYMS, Secretary, Gas Office, 56, High Street, ROCHESTER.
Feb. 12, 1870.

A Large Wet Gas-Meter Manufacturing Company wishes to arrange with some respectable Person or Firm to represent them in London, as well as for Shipment, and the Southern Counties. References given and required.
Apply to P. M., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a good second-hand Vertical CONDENSER (Annular preferred), suitable for Gas-Works making 40,000 cubic feet daily.
Offers for the above (put on railway trucks), accompanied with rough sketch and description, addressed H. B. T., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO BE SOLD CHEAP, on the works of the British Gaslight Company, Limited, Norwich, Two STATION-GOVERNORS, to pass 30,000 cubic feet per hour each.
PHOTOMETER, by A. Wright, complete.
One 10-in. PILLAR VALVE, fluted column, and engraved index-plate.
One 8-in. Ditto.
Various 8-in. Bends and Connexions.
For prices and particulars apply to C. TADMAN, Superintendent, NORWICH.
Feb. 10, 1870.

J. BROUN, having disposed of his works to the Waltham Abbey and Cheshunt Gas Company, in accordance with their Act of Parliament, is desirous of Leasing or Purchasing Gas-Works, or would undertake the Management where the remuneration depended on results.
8, OSBORNE VILLAS, Westgreen Road, TOTTENHAM, N.

FOR SALE, the Apparatus of a small Gas-Work, comprising Retort-House Fittings, Scrubber, Purifiers, Station-Meter, Gasholders, Governor, Valves, and sundry Connexions.
Also a GASHOLDER (counterbalanced), 50 ft. by 18 ft., with cast-iron tank (by Piggott). The whole being put out of use from recent enlargement of works.
Particulars may be obtained on application to Mr. S. W. DURKIN, Gas-Works, SOUTHAMPTON.

BROMLEY GAS CONSUMERS COMPANY.
NOTICE is hereby given, that the YEARLY ORDINARY GENERAL MEETING of the SHAREHOLDERS of this Company will be held at the Bell Hotel, Bromley, Kent, on MONDAY, the 28th inst., to receive the Report of the Directors and Balance-Sheet approved by the Auditors, to declare a Dividend, and for general business.
The Chair will be taken at Eight o'clock precisely.
By order,
GEORGE H. OSBORN, Secretary & Manager.
Offices, Brick-kiln Lane, Bromley,
Kent. Feb. 14, 1870.

EAST BARNET GAS AND WATER COMPANY.
(Incorporated by Act of Parliament.)
OFFICES—ALBERT ROAD AND LYTTON ROAD, EAST BARNET, HERTS.
NOTICE is hereby given, that the EIGHTH ORDINARY GENERAL MEETING of the PROPRIETORS of the Company will be held at the London Tavern, on FRIDAY, the 25th day of February, 1870, at Two p.m.
By order,
Feb. 10, 1870. WM. C. HUMPHRYS, Secretary.
Business—To receive the Directors Report and Statement, and for general business.
The Transfer Books will be closed from the 18th to the 28th inst. inclusive.

COAL TAR.

THE Directors of the Canterbury Gas and Water Company invite TENDERS for the purchase of their surplus TAR, estimated at 50,000 gallons, for One year, from the 1st of March next. The Contractor must remove the Tar at his own expense, as required by the Manager of the Works, and pay for it monthly.
The Directors do not bind themselves to accept the highest tender.
Tenders to be delivered at the Company's Offices on or before Thursday, the 24th of February inst.
By order, JAMES BURCH, Secretary.
Secretary's Office, Castle Street,
Canterbury, Feb. 8, 1870.

GLASGOW CORPORATION GAS.

CONTRACT FOR GASHOLDER & FRAMING.

THE Committee of the Town Council on Gas Supply are prepared to receive TENDERS for the construction of a TELESCOPE GASHOLDER, 160 ft. by 60 ft., at Tradeston Gas-Works.
The Committee are also prepared to receive TENDERS for providing and erecting COLUMNS and GIRDERS, forming framing of above Gasholder.
Plans and specifications may be seen, and forms of tender obtained, at the Engineer's Office, 42, Virginia Street, on and after Thursday, the 17th current.
Sealed tenders, marked "Tender for Gasholder," or "Tender for Framing" (as the case may be), to be lodged with the Engineer, not later than the 26th current.
42, Virginia Street, Glasgow, Feb. 12, 1870.

GLASGOW CORPORATION GAS.

SUPPLY, MAINTENANCE, AND REPAIR OF DRY METERS.

THE Committee of the Town Council on Gas Supply are prepared to receive OFFERS for the supply of NEW METERS of various sizes, from No. 1 upwards. The Meters to be constructed on the Dry principle, and to be of the best materials and workmanship. All New Meters must be stamped at the Testing-Office at Glasgow, and must be maintained in complete repair for a fixed period, to be stated in the offer. The present requirements are about 6000 New Meters per annum, and offers may be made for the whole, or for not less than 2000 per annum, and both for a period of years.
The Committee are also prepared to receive Offers for the Supply, Maintenance, and Repair of Dry Meters as above, for such period of time as Offerers may desire.
The Committee are also prepared to receive Offers for the Repair of the existing Meters (both Dry and Wet) for a series of years, and having all Unstamped Meters put into sufficient Repair and duly Stamped at Glasgow. All Meters must be Stamped before July, 1874.
Offers to be lodged on or before the 15th of March, marked "Tenders for Gas-Meters," with the Treasurer, at the Corporation Gas Office, Virginia Street, Glasgow.
The Committee do not bind themselves to accept the lowest or any tender.
Corporation Gas Office, Glasgow, Feb. 9, 1870.

TO BE SOLD CHEAP, a second-hand PURIFIER, 10 ft. by 5 ft., and 3 ft. 6 in. deep, with 4-in. connexions, and sieves, all complete and in good condition.
Apply to HENRY WEBB, Manager, Gas-Works, EVESHAM.

TO GASHOLDER MAKERS.

THE Directors of the Wisbech Gaslight and Coke Company, Limited, are prepared to receive TENDERS for the erection, at their works at Wisbech, of a GASHOLDER, 60 ft. diameter, 18 ft. high.
The general conditions of the contract to be obtained by application to Mr. W. HORSLEY, Manager, Gas-Works, WISBECH.

TO TAR DISTILLERS, &c.

THE Directors of the Holyhead Gas Company are prepared to receive TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR manufactured at their works for a period of One or Three years, from the 1st day of February next. Price per gallon or per ton.
Of Tar, the Company have about 12 tons now in stock ready for sale. JOHN ROBERTS, Manager.
Gas-Works, Holyhead, Anglesea.

Just published, roan tuck, gilt edges, price 6s., postage 4d.,

WEALE'S ENGINEER'S, ARCHITECT'S, AND **CONTRACTOR'S POCKET-BOOK for 1870.**

Besides the usual vast mass of Rules, Formulæ, Tables, &c., the following valuable information for Gas Engineers will also be found in the work:—
A GAS ENGINEER'S CALENDAR;
GASEOUS PRODUCTS OF COAL DISTILLATION;
CONSTITUENTS AND QUALITIES OF GAS;
THE VARIOUS METHODS OF TESTING GAS;
SPECIFIC GRAVITIES, VOLUME, & WEIGHT OF GAS;
GASHOLDERS AND THEIR CONSTRUCTION;
RETORTS, IRON CEMENTS, &c.
With Eight Copper Plates.
"A multitude of useful tables, without reference to which the engineer, architect, or contractor could scarcely get through a single day's work."—*Scientific Review.*
"Always correct when consulted."—*English Mechanic.*
LONDON:
LOCKWOOD AND CO., 7, STATIONERS' HALL COURT, E.C.

Now publishing,

BAILEY'S ILLUSTRATED INVENTIONS, With Illuminated Cover and over 300 Engravings. Price 1s.

This book is replete with information, and prices of many well-known as well as perfectly new inventions, interesting to all in the mechanical trades, as well as corporations, governments, gas managers, private gentlemen, and shopkeepers.
Post free in the United Kingdom, 1s.
JOHN BAILEY AND CO., Albion Works, Salford, LANCASHIRE.

Now ready, price 21s., bound in cloth, lettered,
THE EIGHTEENTH VOLUME
OF THE
JOURNAL OF GAS LIGHTING, WATER SUPPLY, AND SANITARY IMPROVEMENT.
A Few Copies of Vols. III. to XVII. are still on Sale.
CLOTH CASES, gilt lettered, for binding VOL. XVIII., are now ready, price 2s. 6d., by Post 3s.
London: WM. B. KING, 11, Bolt Court, FLEET STREET, E.C.

CAST-IRON Retorts, Socket-Pipes, with Syphons, and all requisite Connexions, Lamp Columns, Wrought-Iron Tubing, Valves, Street-Lamps, Sight Holes, Furnace Doors, Ash-Pans, Charging and Coke Shovels, Iron Pails, Coke Barrows, Cross Bars, Fire Pots, Pumps, and Iron Borings.
PURIFIERS, CONDENSERS, & SCRUBBERS erected complete, or the materials supplied; and every description of goods in use by Gas-Works, in stock, at wholesale prices, at
Mr. LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground Street, LONDON.

LAMBERT BROTHERS, WALSALL.

ALPHA TUBE & FITTING WORKS

Union Jet Economizer, 1-10th real size of Flame.

PATENT ECONOMIZERS

ADAMAS-POINTED.

Bat's-wing Economizer, 1-10th real size of Flame.

N.B.—All Sizes are Reduced 3s. per Gross. Second Quality ditto also Ready for Delivery.

JOHN HALL & CO.,

STOURBRIDGE,

MANUFACTURERS of FIRE-BRICKS, LUMPS, & TILES,

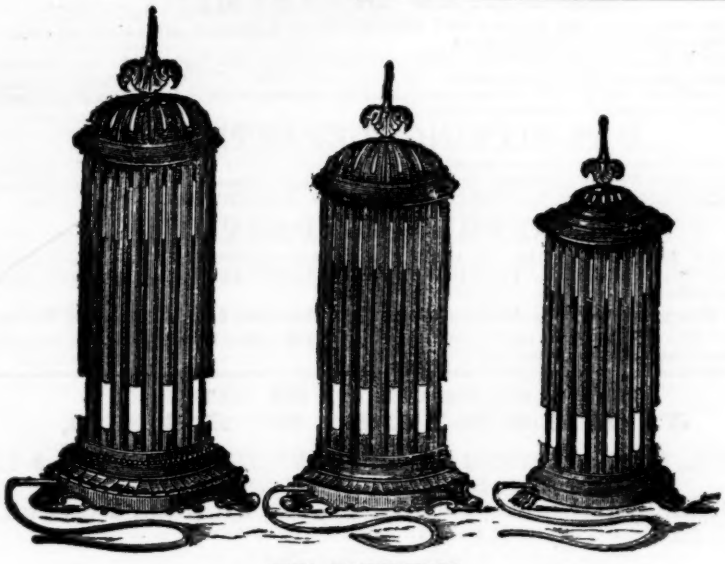
AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short notice.

JOHN WRIGHT & CO.,

GAS STOVE AND BURNER MANUFACTURERS,

30, BROAD STREET, ISLINGTON, BIRMINGHAM.



THIS REGISTERED

RADIATING GAS-STOVE

Is constructed on scientific principles, and gives out great heat by the perfect combustion of a small quantity of gas, avoiding both smell and smoke.

It can be fixed in any room by drawing the flexible Tube over the gas-nipple of an ordinary burner, which supplies sufficient gas for the smaller size.

The following are distinguishing advantages of this Stove:—

It is portable—it is ornamental and effective—it is cheap, both in first cost and in daily use—it requires scarcely any fixing—and there is POSITIVELY NO SMELL.

PRICES.

	s.	d.		s.	d.
No. 210 Stove, 21 in. high	12	6	No. 216 Stove, 40 in. high	42	0
,, 212 ,, 26 in. ,, ...	17	6	,, 218 ,, 48 in. ,, ...	63	0
,, 214 ,, 32 in. ,, ...	25	0	12 ft. of Prepared Tube for ditto.	6	0
12 ft. of Prepared Tube for ditto.	4	0	Cock and Nozzle for ditto	2	6
Cock and Nozzle for ditto	1	6			

UNSOLICITED TESTIMONIAL.

Melrose Lodge, Silverhill, Hastings, July 30, 1869.

To Messrs. John Wright and Co.

Dear Sirs,—Owing to the coldness and dampness of this house, I was induced to become the purchaser from Messrs. Alderton and Shrewsbury of two of your Improved Radiating Gas-Stoves, one for the house and the other for my stable.

I want to ask if a smaller burner could not be put to the No. 216 Stove, as the house soon becomes so extraordinarily hot that I am obliged to reduce the gas. If a smaller burner can be introduced I will get one through Messrs. Alderton and Shrewsbury.—I remain, dear sirs, yours respectfully,

WILLIAM SHUTTLEWORTH.

P.S.—I think it right to say that our servants are much pleased with the Stove in the hall, from the fact that there is no trace of smell or smoke.

Five or more Stoves delivered free. Trade Discount 32½ per cent.

No. 408.
Complete, as drawn, with 7-in. Opal Shade, 17s. 6d.

No. 307.
Complete, as drawn, with 8½-in. Opal Shade, 21s.
Lamp only, 10s. 6d.

WRIGHT & CO.'S
IMPROVED TERRA COTTA STOVES.

No. 83.

No. 83.—Price 25s. each.
,, 85. ,, 35s. ,,
,, 87. ,, 45s. ,,
Cock and Nozzle for do. .. .. 1s. 6d.
12 ft. Prepared Tube for do. .. 4 0

No. 96.—Price 45s. each.
Cock and Nozzle for do. .. .. 1s. 6d.
12 ft. Prepared Tube for do. .. 4 0

Trade Discount 32½ per cent.

These Stoves are fitted with Bunsen's Burner. They throw out more heat than any other Terra Cotta Stove that has yet been introduced.

No. 96.

Drawings and Price Lists of all John Wright and Co.'s Manufactures free on application.

GAS PURIFIERS FOR SALE.

IN consequence of Enlargement, a Set of Four Cast-Iron PURIFIERS, 6 ft. by 4 ft. 3 in., with four tiers of riddles in each, lids, centre-valve, 7-in. connecting-pipes, and crane for removing lids, all complete and in working order.

Apply to THOS. BELL, Gas-Works, SELBY.

CLIMPY CANNEL COAL.—Gas per ton, 12,488 cubic feet; illuminating power, 32·59 candles. Coke excellent.

WILSONTOWN CANNEL COAL.

Gas per ton, 10,810 cubic feet; illuminating power, 28·41 candles. Coke very good.

Shipping ports, Granton, Firth of Forth, and Glasgow.

Agent, ROBERT SMALL, Coal Factor, Yeamen Court, DUNDEE.

PIRNIE or METHILL CANNEL COAL.

This Cannel forms a good substitute for Boghead Coal, either for gas or oil making. The yield per ton is 10,827 feet of 32-candle gas, or 56 gallons of crude oil.

Ports of Shipment, Methill, Burntisland, and Tayport.

Apply to J. W. KIRKBY, Manager, Pirnie Colliery, Leven, FIFE.

THE

HUCKNALL COLLIERY COMPANY

Can offer a CANNEL COAL yielding a large quantity of Gas of superior quality.

Prices and information on application to the HUCKNALL COLLIERY COMPANY, Hucknall Torkard Collieries, near NOTTINGHAM.

ROBERT MACLAREN and CO.,

EGLINTON FOUNDRY, GLASGOW,

Manufacturers of all sizes of Cast-Iron Main-Pipes by an improved Patent, General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

ADDISON POTTER,

WILLINGTON QUAY,

NEAR NEWCASTLE-UPON-TYNE,

Manufacturer of Clay Retorts, Fire-Bricks, and every description of Fire-Clay Goods.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 42, Parliament Street, WESTMINSTER. [Office of the JOURNAL OF GAS LIGHTING, &c.]

NATURAL

HYDRATED OXIDE OF IRON,

Superior quality, constantly ON SALE at

MARTYN DENNIS AND CO.'S,

2, ORIEL CHAMBERS, WATER STREET, LIVERPOOL.

HENRY F. WILLEY,

GAS ENGINEERING WORKS,

BARTHOLOMEW STREET, EXETER,

MANUFACTURER OF EVERY DESCRIPTION OF GAS APPARATUS,

Invites particular attention to his

GAS-METER DEPARTMENT,

Where he manufactures both WET and DRY METERS, several hundreds of which are in use in many Gas-Works in England, Ireland, and Wales.

These Meters have received the highest praise from many eminent Gas Engineers, for their excellence of manufacture, superiority of workmanship, and accuracy of register. They are warranted to measure correctly and not to vary. Every Meter manufactured by him maintained in perfect repair for a period of *five years*. All bear the Government stamp.

GAS-FITTING DEPARTMENT.

A variety of very beautiful and choice patterns and designs adapted for any character of buildings, including MEDIÆVAL FITTINGS for CHURCHES, &c.; Handsome STAR PENDANTS for ASSEMBLY ROOMS, &c.; CHANDELIERS, PENDANTS, BRACKETS, &c.

ENGINEERING DEPARTMENT.

Every description of GAS APPARATUS, comprising GASHOLDERS, STATION-METERS, GOVERNORS, CONDENSERS, PURIFIERS, RETORTS, SLIDE-VALVES, and every article appertaining to Gas-Works.

Gas Companies advised on Improvements, Extensions, and Alteration of Works.

*** The very best material and workmanship guaranteed, and at prices bearing a favourable comparison with any House in the Kingdom.

TO GAS COMPANIES AND THE TRADE.

J. DEFRIES & SONS,

MANUFACTURERS OF

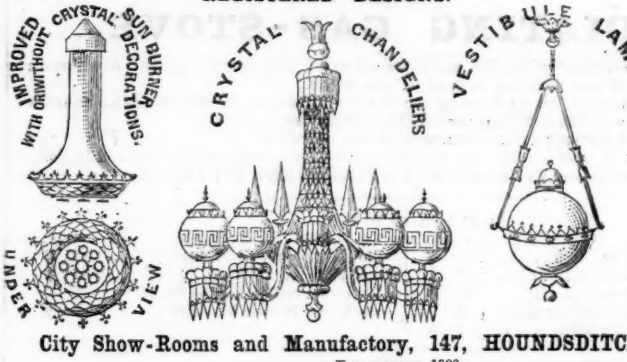
CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, AND THE PATENT CRYSTAL ILLUMINATION;

Vestibules, Iron Barrel, Composition Tubing, Dry & Wet Meters, & Gas-Fittings

OF EVERY DESCRIPTION.

WORKS: LONDON, BIRMINGHAM, & PARIS.

REGISTERED DESIGNS.



Special Designs prepared in perfect accordance with architectural arrangements. Estimates furnished for the Lighting and Fitting up of Theatres, Music Halls, and Public or Private Buildings with Gas.

GAS MOONS of the newest designs.

The Patent Gas-Regulator and Purifier reduced to 6s. 6d. per Doz.

Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1870, are now complete.

City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.

ESTABLISHED 1803.

SILVER MEDAL, PARIS EXHIBITION, 1867.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS

For Gas, Steam, Water, &c.

SOLE LICENSEES for the United Kingdom for the LAVENANT PATENT ENAMELLED TUBES & FITTINGS,

the Coating of which does not shell off, is a certain preservative from rust, and resists all effects of expansion and contraction.

LAP-WELDED IRON & HOMOGENEOUS METAL TUBES

For Locomotive, Marine, and Stationary Boilers.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools of all kinds.

London Offices: No. 4, Cloak Lane, Queen Street, E.C.

WAREHOUSES:

LONDON: No. 157, Upper Thames Street, E.C. LIVERPOOL: No. 4, Cooper's Row, and 3, Crooked Lane, Strand Street. MANCHESTER: Barlow's Croft, Chapel Street, Salford. PARIS and LILLE.

BEST AND HOLDEN'S

PATENTS FOR CHARGING AND DRAWING GAS-RETORTS,

WITH CHAMBERS FOR MOUTHS,

REQUIRING NO LUTING.

Gas Engineers are solicited to examine into the merits of this invention before erecting new or altering old retort-houses. It may be seen in action at the **Alliance Gas Company's Works, Dublin,** where its utility and economy will be clearly demonstrated. Although the saving in labour will be considerable, and quickly return any outlay of capital, there are other and important features strongly recommending its adoption at all gas-works, and which a gas engineer upon examination will at once appreciate.

The Directors of the Alliance Gas Company have kindly consented to give every facility to gentlemen desirous of seeing the invention in operation. Parties, therefore, about to visit Dublin will be so good as to send us their card, and we will furnish them with letters of introduction.

Drawings, &c., may be seen at our Office, and all details explained.

JOHN CHISHOLM, SON, & CO., 44, MARK LANE, E.C.

COLOMBO GAS AND WATER COMPANY, LIMITED.

Incorporated under the Companies Acts of 1862 *and* 1867, *with Limited Liability.*

Capital £75,000, in 7500 Shares of £10 each,

Of which £10,000 has been already subscribed in Ceylon, with power to increase the capital to £200,000.

Deposit on Application £1 per Share, and £2 on Allotment.

The subsequent Calls not to exceed £2 per share, and at intervals of not less than three months. Unless the necessary Capital is subscribed no Allotment will be made, and the Deposits will be returned in full.

DIRECTORS.

Sir Samuel Canning, C.E., F.R.G.S.
Arthur Pratt Barlow, Esq., Director of the Great Western Hotel Company.
Thomas Glen, Esq., Director of the Hong Kong and China Gas Company.
Lieutenant-Colonel Alfred Pearson, Junior United Service Club.
Major W. S. Suart, R.E., Director of the Hong Kong and China Gas Company, and the Bombay Gas Company.

COMMITTEE IN COLOMBO.

Alfred Wise, Esq. (Messrs. Geo. Stewart and Co.)
G. S. Duff, Esq., Oriental Bank, Colombo.
John Thomas White, Esq. (Messrs. J. M. Robertson and Co.)
Robert Dawson, Esq. (Messrs. R. Dawson and Co.)

BANKERS.

The Oriental Bank Corporation, London and Colombo.

SOLICITORS.

Messrs. Cope, Rose, and Pearson, 26, Great George Street, Westminster.

ENGINEER.

Edward Woods, Esq., C.E., 3, Storey's Gate, Westminster.

FIRST AUDITORS.

Alfred Hersee, Esq., Secretary of the Oriental Gas Company.
William Marshall, Esq., Secretary of the Bombay Gas Company.

SECRETARY.—C. E. Walduck, Esq.

Registered Office—11, Old Jewry Chambers, E.C.

The immediate object for which the Company is established is to supply the town of Colombo, in Ceylon, with Gas. Power is also taken, in the Articles of Association, for water supply and drainage, and hereafter to extend the Company's operations to other towns and places in Ceylon; but these works are not to be undertaken without the sanction of the shareholders in General Meeting.

The population of the town of Colombo is now about 55,000 persons, and is rapidly increasing, while the commerce and civilization of which it is the centre are largely extending.

A contract has been entered into with the Municipal Council for lighting the town with Gas, of which the following are the principal provisions, viz.:—

1. The grant to the Company of the exclusive right of supplying Gas within the town of Colombo for three successive periods, amounting together to a period of 21 years from the date of the contract.
2. The Company to enjoy the privilege of importing the materials for the works duty free.
3. An immediate order of 600 public lamps to be supplied with Gas, and paid for by the Council at the rate of 13s. 3d. per 1000 cubic feet, in addition to 9 per cent. per annum on the outlay involved in the erection of the lamps.
4. Power to the Company to supply Gas to the general public at prices varying from 17s. 3d. per 1000 feet to small consumers, to 15s. 3d. per 1000 feet to large consumers.

The Municipal Council have assisted the Company to secure a very desirable site for the works, containing nearly three acres of land, at a moderate cost, in the centre of the town, on low ground, and with easy water communication for the delivery of coals.

A contract has been entered into with the eminent firm of Messrs. Laidlaw and Son, of Glasgow, to supply all the materials for the construction of the Gas-Works at Colombo, at prices which have been fixed by Mr. Woods, C.E., the Company's Engineer, and to complete and open the works within 18 months from the date of signing the contract.

The Company will thus be in a position to earn dividends from the sale of Gas secured to them so soon as the works can be opened, and the profits will be increased by the sale of coke, tar, ammoniacal liquor, and other products, for which there is likely to be a large demand.

It has been ascertained, by careful estimates, that £60,000 will be quite sufficient to establish the Gas-Works, and leave a working Capital of £9000 or £10,000.

Assuming that the amount of Gas supplied to private consumers equals only that supplied to the public lamps, the Directors have satisfied themselves that the profit earned by the Company will be sufficient to provide a dividend of upwards of 12 per cent. on the outlay.

With a view to test the feeling of the colony, and in accordance with the wishes of the Municipal Council, one-third of the capital has been offered for subscription in Ceylon. At the date of the last advices shares to the amount of £10,000 had been already taken, with an assurance of further subeription.

No outlay for concession nor promotion-money will be made, and the preliminary expenses are, in the Directors opinion, of reasonable amount. The Directors confidently hope that their experience in similar undertakings may be regarded as a guarantee that the works will be economically and efficiently constructed, and that the management of the Company will be constructed in such a manner as to satisfy all parties.

A copy of the Memorandum and Articles of Association, and of the several contracts after mentioned, can be seen at the Offices of the Company's Solicitors, from whom, as also from the Engineer or Secretary of the Company, further information may be obtained.

The following is a list of all the contracts entered into by the Company as the Promoters, Directors, or Trustees thereof, before the issue of this Prospectus:—

Date.	*Parties.*
Jan. 21, 1870.	The Municipal Council of Colombo of the one part, and the Company of the other part.
April 24, 1869.	David Laidlaw and Robert Laidlaw of the one part, and the Company of the other part.
April 28, 1869.	The Company of the one part, and Edward Woods of the other part.

Prospectuses and forms of application for shares may be obtained at the Offices of the Company, 11, OLD JEWRY CHAMBERS, and through any respectable Broker.

TO GAS & WATER METER MANUFACTURERS, MACHINISTS, AND OTHERS.

J. H. ROBINSON AND CO.,

ENAMELLERS, DIAL AND TABLET MANUFACTURERS,

THE MERSEY WORKS,

347, GRAFTON STREET, TOXTETH PARK,

LIVERPOOL.

Manufacturers of all descriptions of Gas and Water Meter, Clock, Timepiece, Tell-Tale and Log Dials, Lettered Addresses, Number Plates, Gauges, Scales, &c.

C. & W. WALKERS' WOOD SIEVES FOR PURIFIERS.

These justly celebrated Sieves, with bevel bars and hardwood side frames, have been extensively made by Messrs. Walker for over seven years, and their advantages and durability are fully established. Messrs. Walker make them in very large quantities, having mills and machinery specially laid out for them, producing them at the most moderate cost.

MIDLAND IRON-WORKS,

DONNINGTON, NEAR NEWPORT, SHROPSHIRE.

8, FINSBURY CIRCUS, LONDON, E.C.

PRICE'S PATENT COKE & COAL BARROW,

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Gas-Works, HAMPTON WICK.

TO GAS COMPANIES, &c.

THE PATENT ANTI-GALVANIC PAINT

Is guaranteed to prevent and arrest rust on all ironwork, and is specially recommended as the only Paint to effectually cover tar and preserve Gasholders and Purifiers, being a perfect repellent to the gaseous exhalations, &c., arising therefrom. Sample cans sent free of charge.

For further particulars apply to R. E. KEEN, 50, Claremont Road, SURBITON, S.W.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, E.C., and 138, Regent Street, LONDON. Agents wanted.

THOMAS PROUD,

GAS ENGINEER, CONTRACTOR, & FITTER,

7, UNETT STREET, ST. GEORGE'S,

BIRMINGHAM.

SOLE AGENT TO

GEORGE SKEY AND COMPANY,

LIMITED,

WILNECOTE WORKS,

Near TAMWORTH,

FOR

FIRE-CLAY GAS-RETORTS,

and all kinds of

Fire Goods required by Gas Companies.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

CATHELS'S Patent Four-way Disc Gas-VALVE—ONE OF WHICH SERVES AS THREE ORDINARY VALVES—is the best Valve for Gas-Works.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

CATHELS'S Patent Ribbed Gas Main-PIPES cost but about 1d. to 2d. per yard (depending on the size) more than Plain Pipes, and ensure PERFECT GAS-TIGHT CONNEXIONS with the Service-Pipes.

Apply to Messrs. BEGGS & SON, 37, Southampton Street, Strand, LONDON.

JAMES OAKES & CO.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

PROSPECTUS OF THE

ROUMANIAN GASLIGHT COMPANY, LIMITED.

Capital £200,000, in 10,000 Shares of £20 each

Payable—£2 on application, £3 on allotment, £5 on the 2nd of May, 1870, £5 on the 1st of November, 1870, and £5 on the 1st of May, 1871.

In case of no allotment, the money will be returned without deduction.

Shareholders paying up their Shares in full will receive discount at the rate of 5 per cent. per annum on the amount paid by anticipation, and, on payment of the Government Stamp Duty, will be entitled to receive share warants to "bearer," passing by delivery.

DIRECTORS.—*In Bucharest.*

Jacques Poumay, Esq., Banker.

In London.

E. H. J. Craufurd, Esq., M.P., Chairman of the Walton-on-Thames and Weybridge Gas Company.
Loftus Fitzwygram, Esq., 89, Eccleston Square.
William Haywood, Esq., F.R.S., Civil Engineer, 63, Hamilton Terrace.
James Duke Hill, Esq. (Coal Exchange).
Francis D. Lambert, Esq. (Messrs. Lambert, Sons, & Scott, Coal Exchange), 85, Gracechurch Street.
Alfred Penny, Esq., of the Oporto and of the Whitehaven New Gas-Works.
George E. Seymour, Esq., late Director of the Anglo-Austrian Bank.
Adolphus William Young, Esq., M.P., Director of the Phœnix Gas Company.

BANKERS.

Messrs. Barclay, Bevan, Tritton, Twells, and Co., London.

ENGINEER.

Mr. G. W. Stevenson, C.E., 19, Great George Street, S.W.

CONSULTING ENGINEER.

Mr. Edward Woods, C.E., 3, Storey's Gate, S.W.

SOLICITORS.

Messrs. Nash, Field, and Layton, 2, Suffolk Lane, Cannon Street, E.C.

BROKERS.

Messrs. Crosley Brothers and Co., 3, Royal Exchange Buildings, Cornhill, E.C.

SECRETARY (*pro tem.*)—Mr. Alfred Rippon.

Temporary Offices—Lombard House, George Yard, Lombard Street, London, E.C.;

And at the Banking House of Mr. Jacques Poumay, Bucharest.

The Roumanian Gaslight Company, Limited, has been formed for acquiring and working a concession which has been granted by the Municipality of Bucharest for the exclusive right of lighting that city with gas.

The term of the concession is 40 years, from the 8th of April, 1868; at the expiration of that period the works will become the property of the Municipality on payment of £48,000 to the Company. A sinking-fund is provided by the Articles of Association, for replacing the original outlay at the termination of the concession.

The city of Bucharest, the capital of the Danubian Principalities, is an increasing city; its population is estimated by the Mayor, M. Cantacuzene, at 250,000 persons, occupying about 34,000 houses. Railways are in course of construction connecting Bucharest with the principal continental lines. The first line of 42 miles is now open from Giurgevo, the nearest port on the Danube to Bucharest.

A site of 7½ acres for the Gas-Works, immediately adjoining the new railway-station, has been granted by the Municipality, free of all charge.

Coals are to be admitted free from municipal dues, for the exclusive purpose of the manufacture of gas.

The Municipality have contracted to pay for a minimum of 4000 public lights at the rate of 6s. 10d. per 1000 cubic feet. The quantity of gas thus contracted for is upwards of 60 millions of cubic feet per annum, and the Engineers estimate that the receipts from the public lighting alone will pay a net profit of 3½ per cent. on the total capital of the Company, after setting aside a sufficient amount to provide for the sinking-fund above referred to. The concession further gives the right to charge to private consumers 8s. 10d. per 1000 cubic feet. The Engineers report that from this source of revenue a profit of over 14 per cent. may be expected so soon as the works are fairly established, thus making together a profit of nearly 18 per cent. on the capital. They estimate that the best English coal may be delivered on the works at a cost not exceeding 35s. per ton, and that coke will be sold at 40s. per ton. The rates for gas are subject to a reduction of 10 per cent. at the expiration of each period of ten years during the term of the concession.

The estimates of cost for the erection of works of a plain and substantial character have been prepared by Mr. G. W. Stevenson, C.E. Before proceeding to make the provisional contracts based thereon, these estimates were submitted to Mr. E. Woods, C.E., who, after having investigated the matter independently, reported that the same are reliable and moderate. The reports of these gentlemen are appended.

Provisional contracts have been entered into by the Company for the execution of the works for sums within the estimated amounts. The business of the Company will not be commenced until, in the judgment of the Board, a sufficient number of shares have been subscribed for.

By the Articles of Association it is provided that the amount payable by the Company towards the preliminary expenses is limited to £5000.

The concession granted by the Municipality of Bucharest, the plans of the works, the reports and estimates of the Engineers, the provisional contracts, and the Articles of Association, may be inspected at the Offices of the Company, where every explanation will be given.

Applications for shares must be made on the annexed form (which can also be obtained from the Brokers, Messrs. Crosley Brothers and Co.) to the Directors of the Roumanian Gaslight Company, Limited, but no application will be considered unless accompanied by a deposit of, or the receipt of the Bankers for, £2 per share on the number of shares applied for.

The subscription list will be closed on Monday, the 21st inst., in London, and on the following day for the country.

CANNEL COAL.—The West Yorkshire Iron and Coal Company, Limited, beg to draw the attention of Gas Companies to their Cannel, of which the following is the analysis made by W. Huggon, Esq., F.C.S.:

Yield of gas per ton	10,296 cubic feet.
Illuminating power rather over	21 sperm candles.
Yield of coke per ton . . .	12 cwt.

The actual working, as reported by one of the largest gas companies in Yorkshire, gives results still more favourable, viz.—

Yield of gas	10,416 cubic feet.
Illuminating power	21·89 sperm candles.
Coke	The same.

We add from the same source the capabilities of the common gas coal—

Yield of gas	10,080 cubic feet.
Illuminating power	14·41 sperm candles.
Yield of coke	13 cwt.

COLLIERIES—WEST ARDSLEY, near LEEDS.

For further particulars, address to the Office of the Company, 15, York Place, LEEDS.

POPE & PEARSON'S GAS COAL.—We have now the authority of several of the most eminent Gas Engineers of London in stating that our Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles.*

One ton yields 12¼ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, West Riding and Silkstone Collieries, near LEEDS.

OLD WEMYSS CANNEL COAL.—Yield of gas per ton, 12,896 cubic feet; illuminating power, 31·75 standard candles. Port of shipment, Wemyss.

Analysis and price on application to Mr. WM. CAREY, Manager, Wemyss Colliery, Kirkcaldy, FIFE.

CANNEL COAL.

MESSRS. GRIFFITHS BROTHERS,
COPPA COLLIERY, MOLD,

Beg leave to call the attention of Gas Companies to the superior quality of their Cannel for gas-making purposes.

This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

Ports of shipment—Birkenhead or Connah's Quay.

Waggons supplied for delivery by railway to any part of England or Wales.

For particulars, prices, and rates of freight, apply to GRIFFITHS BROTHERS, Coppa Colliery, Mold, FLINTSHIRE.

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS,
&c., &c.,
SCOTSWOOD FIRE-BRICK WORKS,
NEAR
BLAYDON-ON-TYNE.

THOMAS EDINGTON & SONS,
PHŒNIX IRON-WORKS,
GLASGOW,
Manufacturers of all kinds of
GAS AND WATER PIPES,
Branches, Bends, Water-Traps, Tank-Plates, Valves, and general Castings. Also
RAILWAY CHAIRS & SLEEPERS,
AND
GRIFFIN'S PATENT PERMANENT WAY.
London Office, 63, Old Broad Street.

OXIDE OF IRON.—We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.
FRANCIS RITCHIE & SONS,
BELFAST.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Office in London, Mr. E. M. PERKINS, 101, Cannon Street, E.C.

WALTER MABON & CO.,
Engineers,
ARDWICK IRON-WORKS,
FAIRFIELD STREET, MANCHESTER,
MANUFACTURERS OF
IRON TANKS, GASHOLDERS,
GAS APPARATUS,
PIPES, VALVES, IRON ROOFS,
WROUGHT AND CAST IRON GIRDERS.
DESIGNS, SPECIFICATIONS, & ESTIMATES FURNISHED.

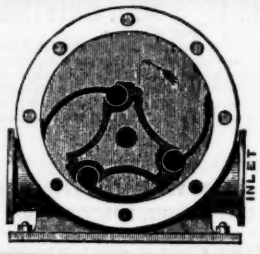
FIRE-CLAY GAS-RETORTS, &c., CANNEL AND STEAM COALS.

WILLIAM FRASER, Inverkeithing (owner of the Works at which Fire-Clay Retorts were first made), having greatly enlarged his Works, can supply Retorts and other Fire-Clay Goods to any extent.

References can be given to managers of above a hundred Gas-Works whom he supplies.

WILLIAM FRASER ships COWDENBEATH PARROT COALS at Charlestown and Burntisland at 12s. per ton; and HALBEATH STEAM COALS, on Navy List, at 8s. 6d. per ton.

In the Press, and shortly will be Published,
THE GAS MANAGERS' HANDBOOK
OF
TABLES, RULES, AND USEFUL INFORMATION
FOR
GAS ENGINEERS, MANAGERS,
AND OTHERS ENGAGED IN THE
MANUFACTURE AND DISTRIBUTION OF COAL GAS.
By THOMAS NEWBIGGING.
Price to Non-Subscribers, 7s. 6d., by post 8s.; to Subscribers, 6s., by post 6s. 6d.
Subscribers' Names received by the Publisher,
WILLIAM B. KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.



CHARLES HORSLEY'S
PATENT
GAS EXHAUSTER.
(From 250 Feet to 200,000 Feet per Hour.)
Also,
ROTARY TAR, OIL, AND LIQUOR PUMPS.
For particulars and prices apply to the Patentee,
22, Wharf Road, City Road, London, N.

SAMUEL CUTLER & SON,
CONTRACTING GAS ENGINEERS, &c.
MANUFACTURERS OF GASHOLDERS, TANKS, PURIFIERS,
AND ALL DESCRIPTIONS OF GAS-MAKING APPARATUS.
Iron Roofs, and General Iron Work. Mains Supplied and Laid.
S. C. & SON supply every requirement for a Gas-Work, and keep in stock Retort-Lids, Cotters, Barrows, Scoops, Bolts and Nuts, &c., &c.
PROVIDENCE IRON-WORKS, MILLWALL, LONDON, E.

SCHOLL'S
PATENT PLATINUM
GASLIGHT PERFECTER.

Extract from Report by Dr. Letheby:—
"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."
Price 1s. each for Fishtail Burners.
To be had retail of Gas-Fitters and Ironmongers, and wholesale of
JOHN SCHOLL, 41 & 42, BERWICK STREET, OXFORD STREET,
LONDON, W.
Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.
*** Further testimonials from Drs. Frankland and Crooks, showing the great practical value of this invention, will be shortly published.

GEORGE ORME & CO.,
MANUFACTURERS OF
CONSUMERS GAS-METERS, STATION-METERS, GOVERNORS,
PRESSURE & EXHAUST REGISTERS,
PRESSURE-GAUGES, MINUTE-CLOCKS, PHOTOMETERS,
INDICES FOR GAS AND WATER METERS,
INDICATORS,
FITTINGS FOR RAILWAY CARRIAGES AND LAMPS,
AND EVERY DESCRIPTION OF
GAS, STEAM, & WATER FITTINGS,
ON THE MOST APPROVED PRINCIPLE.
WORKS: PARK STREET, OLDHAM.

GEORGE ANDERSON,
GAS AND CONSULTING ENGINEER,
19, NORTHUMBERLAND STREET, STRAND, W.C.
MR. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.
PATENTEE and MANUFACTURER of the following Inventions:—
RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.
BREEZE AND TAR FUEL MACHINE.
A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.
N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.
"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

D Clay Retort.

D Iron Retort.

FRASER'S PATENT RIBBED RETORTS.

The IRON RIBBED RETORTS are more durable than plain castings, and retain their original shape to the last.

The "Ribs" strengthen the FIRE-CLAY RETORTS, and by affording an increased heating surface favour the more speedy and perfect carbonization of the Coals.

These Retorts are now in use at some of the London works, and in a great number of the provincial gas-works.

For Illustrated Circular, with testimonials, &c., apply to

A. C. FRASER, GAS-WORKS, COLCHESTER.

F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

Established 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

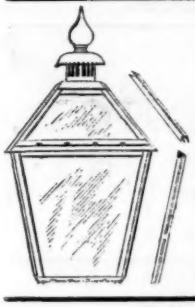
ROBERT DEMPSTER,

Gas Engineer and Contractor, Rose Mount Foundry, Elland, near Halifax.

R. D. recommends his Fire-Brick Retorts to Engineers and Managers of Gas Companies; they last from 10 to 12 years.

Iron and Fire-Clay Retorts.	Wrought-Iron Tubes, Water Tanks.
Annular and Pipe Condensers.	Wrought-Iron & Cast-Iron Roofs.
Scrubbers and Purifiers, all sizes.	Gasholders, Single-Lift or Telescopic.
Steam-Engines and Exhausters.	Gas Castings of every description.
Hydraulic Centre-Valves.	Retort Setters and Fitters sent to all parts of the country.
Station-eMters and Governors.	Wood Sieves for Purifiers.
Photometers & Pressure-Gauges.	
Lamp-Posts and Brackets.	
Cast-Iron Mains and Syphons.	

Plans and Specifications prepared.



TO GAS COMPANIES & LOCAL BOARDS.

KEEN'S PATENT DOUBLE-CLIP STREET-LAMP.

Testimonial.

"I have great pleasure in testifying to the excellence of your Patent Lanterns. After a trial of nearly 12 months, I find there is less breakage of glass resulting from their use, coupled with perfect ventilation of the gaslight, and the ease and facility with which new squares can be inserted render them well worthy the attention of all who are interested in public lighting. We use them at every opportunity, and consider that their advantages only require to be known to be appreciated. (Signed) "James Watson, Engineer.

"*Kingston Gaslight and Coke Company, Feb. 5*, 1870."

For particulars of price, &c., apply to

BRACE, BRACE, & CO., 11, Red Lion Court, Fleet Street, E.C.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, and

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Station-Meters, Governors, Consumers Meters, Gas Lustres, Chandeliers, Brackets, &c., and every description of Gas-Fittings and Gas Apparatus.

REDUCED PRICES

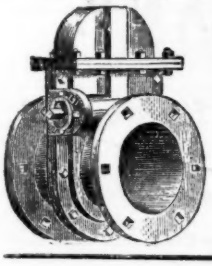
OF

B. DONKIN & CO.'S

IMPROVED GAS-VALVES

WITH WROUGHT-IRON PINIONS,

From 2 inches to 18 inches, price 9s. 6d. to 12s. per inch diameter.



List of prices, with full dimensions of all sizes up to 36 inches, to be had on application.

These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.

VALVES MADE WITH OUTSIDE RACKS TO ORDER.

ALSO,

SCREW WATER-VALVES WITH GUN-METAL FACES.

B. DONKIN & CO.,

GENERAL ENGINEERS AND IRONFOUNDERS,

MAKERS OF STEAM-ENGINES,

BERMONDSEY, LONDON, S.E.

WALTER FORD,

159, GRAY'S INN ROAD, LONDON,

MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c., &c.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for ensuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

EDGE'S Patent for Removing the CARBONACEOUS INCRUSTATION from GAS-RETORTS.

For particulars and terms, apply to E. Goddard, Sole Agent, Gas-Works, Ipswich.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. Sugg & Co., Ghent, will receive immediate attention.

TWENTY YEARS PRACTICAL EXPERIENCE.

EDWIN BENTLEY,

RETORT SETTER,

29, LOWER HOPE STREET, HALIFAX,

YORKSHIRE.

Fire-Clay and Iron Retorts, Double and Single Grooved Brick Retorts, of every description.

Bentley's Improved D Brick Segment Retorts, 5 or 3 in one bed.

Testimonials and references on application.

ALFRED PENNY, Gas and Consulting ENGINEER,

Wenlock Iron-Works,

21, WHARF ROAD, CITY ROAD, LONDON.

Mr. Penny having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, and T-pieces, &c., &c.

Plans, Specifications, and Estimates prepared.

B. CARPENTER'S

IMPROVED

WOOD SIEVES FOR GAS PURIFIERS.

WORKS:

14, JOHN STREET, PENTONVILLE ROAD,

LONDON, N.

The above Sieves are used by the principal Gas Companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from Gas Engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

HARRIS AND PEARSON,

STOURBRIDGE.

PROPRIETORS OF

BEST GLASS-HOUSE POT & CRUCIBLE CLAY.

MANUFACTURERS OF

FIRE-BRICKS, GAS-RETORTS, AND FIRE-CLAY GOODS

OF EVERY DESCRIPTION.

Orders of any magnitude, for home and exportation, executed with all possible despatch.

N.B.—A quantity of Retorts in stock.

Circulars, 15 in. and 16 in. Ovals, 20 in. by 14 in.

D's, 15×13, 16×12, 18×14, 20×16, 21×14, 24×14.

D. GRANT & CO.,

GAS-METER MANUFACTURERS.

STATION-METERS ANY SIZE,

PHOTOMETERS, EXPERIMENTAL METERS, &c.

GAS-METER WORKS, CROSSCAUSEWAY, EDINBURGH.

THOMAS LAMBERT & SONS,

SHORT STREET, LAMBETH, LONDON,

PATENTEES OF THE

HIGH-PRESSURE EQUILIBRIUM BALL VALVES AND DIAPHRAGM BIB & STOP VALVES,

MANUFACTURE EVERY DESCRIPTION OF

GAS-JOINTS, CHANDELIERS, PENDANTS, BRACKETS, ETC.;

WROUGHT-IRON WELDED TUBE AND FITTINGS,

BLACK AND GALVANIZED;

BRASS, COPPER, LEAD, TIN, AND COMPOSITION TUBING;

STOCKS, TAPS, AND DIES,

And Every Description of Gas-Fitters Tools;

CAST-IRON GAS-MAIN COCKS,

WITH PATENT METAL PLUGS;

GAS SLIDE AND SLUICE VALVES;

CARTER'S SAFETY GAS-VALVES;

GAS-STOVES, REGULATORS, BURNERS, &c.

Large Pattern-Book and Price List of Gas-Fittings, price 7s. 6d., supplied on application.

IMPORTANT TO WATER COMPANIES, BUILDERS, &c.

DALZIEL'S PATENT

COMBINED COCK AND VALVE,

OR POSITIVE WASTE OF WATER PREVENTER.

Its simplicity, cheapness, strength, durability, and compactness recommend it for every domestic purpose. By its adoption Water Companies will be enabled to give a constant supply to the public, with certainty that no waste can take place.

To be seen daily in operation at 13, Crooked Lane, King William Street, E.C., from Eleven to Twelve.—For price and particulars apply to

WILLIAM DALZIEL, ENGINEER, CREEK ROAD, DEPTFORD, S.E.

THE GAS-METER COMPANY

(LIMITED), LONDON,

(Successors to CROLL, RAIT, and CO., LONDON, and WEST and GREGSON, OLDHAM.)

MANUFACTURE

STATION-METERS & GOVERNORS

At their Oldham Establishment, which has long possessed the reputation of supplying this description of apparatus of the most perfect construction and appropriate design.

CONSUMERS GAS-METERS IN CAST-IRON & TINNED SHEET-IRON CASES.

STREET GOVERNORS, PRESSURE and EXHAUST REGISTERS, TEST GASHOLDERS,

AND EXPERIMENTAL GAS APPARATUS GENERALLY.

For information, &c., apply to

W. ARCHER, Manager, Meter Factory, OLDHAM;

OR TO

GEORGE RAIT, Managing Director, KINGSLAND ROAD, LONDON.

ORLANDO BROTHERS'

SELF-ACTING DISTRICT GOVERNOR.

Prices, according to size, can be obtained upon application to

Mr. WILLIAM ARCHER,

METER COMPANY'S WORKS, OLDHAM.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.

KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

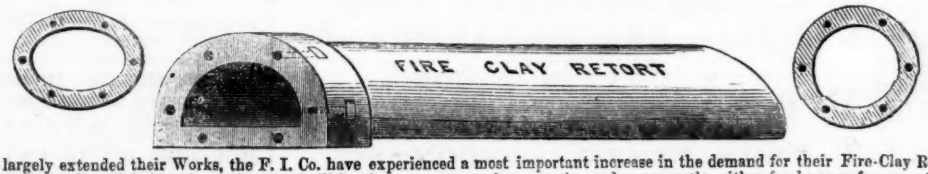
Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

Agent in Ireland—Mr. JAMES FURNESS, No. 3, FOWNES STREET, DUBLIN.

THE FARNLEY IRON COMPANY,

FARNLEY, near LEEDS.



Since they so largely extended their Works, the F. I. Co. have experienced a most important increase in the demand for their Fire-Clay Retorts, which they owe chiefly to the superior quality of their make, and to the facilities they now possess for executing orders promptly, either for *home* or for *export*.

The Fire-Clay raised from the Farnley Estate (commonly called the Wortley bed) is unsurpassed by any other known in the district, and is peculiarly well adapted for Retorts, Gas-Ovens, and Fire-Bricks; and the F. I. Co. beg especially to invite those connected with Gas-Works, who have not yet used their Retorts, to be good enough to favour them with a trial.

The F. I. Co. generally hold in stock, for immediate supply, Fire-Bricks of every size and kind—Tiles, Sanitary Tubes, Ornamental Terra-Cotta Ware White Facing Bricks, the White, Buff, and other Glazed Bricks and Tiles, in various colours and shapes, &c., as well as the Brown Salt-Glazed Bricks, &c., &c.

Prices, Drawings, and all other information may be obtained by applying as above, or to

MR. SUTTON, THE HULL STORES, 46½, QUEEN STREET, HULL.

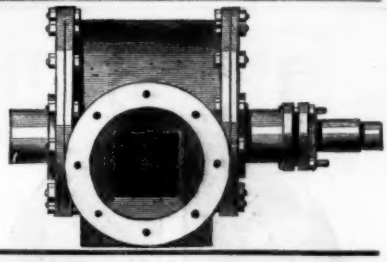
ROTATORY AND DOUBLE-ACTING GAS-EXHAUSTERS,

With many recent improvements, from 1500 to 150,000 cubic feet per Hour.

JAMES BURTON, SONS, & WALLER,

MAKERS OF ENGINES, MACHINERY, and IRONWORK for GAS-WORKS,
Efficient and durable TAR, LIQUOR, and SYPHON PUMPS,
GAS-VALVES, with or without Wedges, worked with powerful Worm and Rack,
SELF-ACTING BY-PASS VALVES, with Lid and Relieving Lever,
ROTATORY, TUMBLER, and CAPILLARY WATER DISTRIBUTORS for SCRUBBERS.
SMALL-SIZE EXHAUSTERS KEPT IN STOCK.

JOHN'S PLACE, HOLLAND STREET, SOUTHWARK, LONDON, S.E.



WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of
RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY
beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.
The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

A large Stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all Sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

E. J. & J. PEARSON,

DELPH & TINTAM ABBEY FIRE-CLAY & BRICK WORKS,

STOURBRIDGE,

PROPRIETORS OF

BEST GLASS-HOUSE POT & CRUCIBLE CLAY;

MANUFACTURERS OF

GLASS-HOUSE POTS, CRUCIBLES, GAS-RETORTS, & FIRE-BRICKS OF EVERY DESCRIPTION.

GAS AND WATER PIPES.

CLARIDGE, NORTH, & CO.,

BILSTON.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS.

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON AGENT:

MARCUS BOURNE NEWTON,

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

GEORGE NEWTON,

UNION STREET WEST, OLDHAM,

MANUFACTURER OF

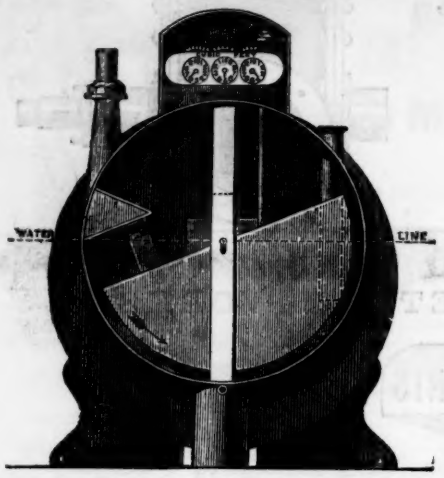
IMPROVED WET & DRY CONSUMERS GAS-METERS,

GAS STATION-METERS,

With all the Joints planed,

GOVERNORS, GAUGES, INDICATORS, EXHAUST GOVERNORS, &c.

TERMS, &c., ON APPLICATION.



THE

UNVARYING WATER-LINE GAS-METER.

(SANDERS AND DONOVAN'S PATENT.)

"Unquestionably the best Water Gas-Meter now in use."

Over 60,000 in action.

MANUFACTURERS:

THE GAS-METER COMPANY,

KINGSLAND ROAD, LONDON;

WITH

Branch Manufactories at DUBLIN and OLDHAM.

ALEXANDER WRIGHT & CO.,

MANUFACTURERS OF

WET METERS,

COMPENSATING WET METERS,

AND

IMPROVED DRY METERS

of the very highest excellence.

STATION-METERS AND GOVERNORS.

STREET-LAMP REGULATORS.

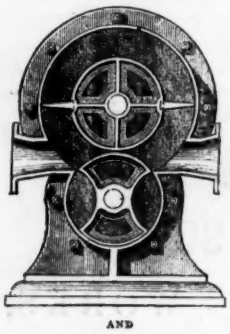
TESTING APPARATUS

of the most perfect description for all purposes relating to Gas.

PRICE'S & KEELING'S PATENT STATION-GOVERNOR REGULATORS.

55 and 55a, MILLBANK STREET, WESTMINSTER, S.W., and COPENHAGEN.

LAIDLAW'S PATENT GAS EXHAUSTER



AND

ROTARY PUMP.

R. LAIDLAW & SON,

GAS ENGINEERS, CONTRACTORS, IRON & BRASS FOUNDERS,

Iron-Works and Foundries, GLASGOW,

Meter-Works & Brass Foundry, EDINBURGH,

Manufacturers of GASOMETERS & GAS APPARATUS of EVERY DESCRIPTION; CAST-IRON PIPES, all sizes, cast in DRY SAND and VERTICALLY by PATENT MACHINERY; IRON ROOFS, COLUMNS, BEAMS, & GIRDERS; BOILERS, TANKS, & CISTERNS; VALVES, Screw, Rack and Pinion, &c., for Gas and Water, with Iron or Gun-Metal Facings, &c.; WROUGHT-IRON TUBE and FITTINGS for Gas, Water, or Steam; GAS-METERS (Wet and Dry) of the most approved Construction, STATION-METERS, GOVERNORS, &c.; GASELIERS, BRACKETS, PENDANTS, PILLARS, & GAS-FITTINGS of every description; LAMP-POSTS and LANTERNS for Streets, &c.

London Address: SOUTHWARK STREET (near Gt. Guildford St.), BORO', S.E.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

Invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus

CAST & WROUGHT IRON PIPE, BLACK & GALVANIZED. COPPER, TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER,

for clearing out Mains, Services, and Interior Fittings—65s. net.

Boyle's Patent Silvered Glass Combination Reflectors and Outside Lanterns.

Sole Manufacturers of Church and Mann's Photometer.

Large Pattern-Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.

London: Printed by WILLIAM BOUGHTON KING (at the office of Clayton and Co., 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, February 15, 1870.